FINAL

TSCA RISK-BASED DISPOSAL APPROVAL APPLICATION

SOUTH SHORELINE WORK ELEMENTS

DUWAMISH SEDIMENT OTHER AREA AND SOUTHWEST BANK CORRECTIVE MEASURE AND HABITAT PROJECT

BOEING PLANT 2

SEATTLE/TUKWILA, WASHINGTON

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List of Abbreviations and Acronyms

Abbreviation/ Acronym	Definition
2-40s Buildings complex	Buildings 2-41, 2-44, and 2-49
Boeing	The Boeing Company
BMP	Best Management Practice
CFR	Code of Federal Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CM	Corrective Measure
Corrective Measures	Duwamish Sediment Other Area Corrective Measure and Southwest Bank Corrective Measure
cy	Cubic yard
Design Report	Final Design Report
DOF	Dalton, Olmsted & Fuglevand
DSOA	Duwamish Sediment Other Area
Ecology	Washington State Department of Ecology
Final Decision Document	*Final Decision and Response to Comments for Boeing Plant 2 Sediments*

HASP	Health and Safety Plan
IM	Interim measure
Jorgensen Forge	Jorgensen Forge Company
mg/kg	Milligrams per kilogram
MLLW	Mean Lower Low Water
Order	Administrative Order on Consent
PCB	Polychlorinated biphenyl
Plant 2	Boeing Plant 2
POTW	Publicly Owned Treatment Works
ppm	Parts per million
Project	Duwamish Sediment Other Area Corrective Measure, Southwest Bank Corrective Measure, and the habitat restoration projects
RBDA	Risk-based Disposal Application
RCRA	Resource Conservation and Recovery Act
SVOC	Semivolatile organic compound
SW Bank	Southwest Bank
TSCA	Toxics Substances Control Act
USACE	United Stated Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VOC	Volatile organic compound

1.0 Introduction

This Risk-based Disposal Approval (RBDA) Application is being submitted pursuant to 40 Code of Federal Regulations (CFR) § 761.61(c) for Toxics Substances Control Act (TSCA) approval for the cleanup, on-site storage, and disposal of materials that contain concentrations of polychlorinated biphenyls (PCBs), meeting the definition of PCB remediation waste, as described in the following sections. This document specifically presents details of the South Shoreline Work Elements.

PCBs are present in portions of the South Shoreline at varying concentrations and frequencies. It is often not possible to distinguish a specific source for the PCBs or to estimate when the release(s) may have occurred; if this were known, it is possible that some of the material may not strictly meet the definition of PCB remediation waste per the TSCA regulations. However, to simplify the remediation process and to minimize segregation throughout the work area, all soils and sediments removed from the South Shoreline are included as part of this RBDA Application. PCB remediation waste with concentrations less than 50 parts per million (ppm) generated as part of this project will be co-mingled with other non-hazardous material generated as part of this project that may not meet the definition of PCB-remediation and will be managed the same and disposed of as solid waste in a Subtitle D landfill. The soils and sediments (but not debris and structures) are appropriate for use as alternate daily cover or for beneficial reuse to add moisture at the landfill providing they also meet applicable landfill acceptance criteria.

1.1 PROJECT OVERVIEW

The Boeing Company (Boeing) is conducting the Duwamish Sediment Other Area (DSOA) and Southwest Bank (SW Bank) Corrective Measure at Boeing Plant 2 (Plant 2) pursuant to the Administrative Order on Consent (Order; Resource Conservation and Recovery Act [RCRA] Docket No. 1092-01-22-3008(h)) issued to Boeing in 1994 by the U.S. Environmental Protection Agency (USEPA) under authority of RCRA Section 3008(h), as amended (42 USC 6928(h)). In addition, a Habitat Project is being performed under a Consent Decree between the Natural Resource Trustees and Boeing.

The DSOA Corrective Measure was selected through the evaluation process described in the *Duwamish Sediment Other Area and Southwest Bank Corrective Measure Alternatives Study* (AMEC and FSI 2011). USEPA selected the preferred alternative in the *Statement of Basis for Proposed Corrective Action, DSOA and Southwest Bank* (USEPA 2011a) and subsequently issued the *Final Decision and Response to Comments for Boeing Plant 2 Sediments* (Final Decision Document; USEPA 2011b).

A Final Design Report (Design Report; AMEC, DOF, and FSI 2012a) has been submitted to USEPA as required under the RCRA Order and was approved on December 19, 2013. The Design Report package, which also includes the Construction Statement of Work (AMEC, DOF, and FSI 2012b), provides details regarding the excavation limits, material handling requirements, and post-construction monitoring. The Design Report also provides USEPA with information on the habitat restoration projects that Boeing is conducting simultaneously with the corrective measure implementation, although the habitat projects are not part of the RCRA corrective measures.

For the purposes of this document, the entire corrective measures addressed in the Design Report, including the DSOA Corrective Measure and the SW Bank Corrective Measure will be referred to as the Corrective Measures. The Corrective Measures and habitat restoration projects will be referred to collectively as the Project.

The Corrective Measures will remove approximately 260,000 cubic yards (cy) of sediments, soils, debris, and structures from the waterway in front of Plant 2 and the adjacent Plant 2 shoreline. The materials are contaminated with PCBs and other constituents of concern. The Corrective Measures footprint is designed to remove soil/sediments containing PCBs at concentrations greater than 0.130 milligrams per kilogram (mg/kg) or ppm. Three localized areas offshore of the SW Bank contain PCBs at concentrations greater than 50 ppm; they represent a total of approximately 260 cy (or less than 0.1 percent) of soil/sediment. The remaining volume of soil/sediment contains PCBs at concentrations less than 50 ppm, with an average concentration of less than 1 ppm.

For the purposes of TSCA approvals, this project has been broken into the following three major elements:

Year 1 Dredging: Dredging of contaminated sediments at Plant 2 north of the 16th Avenue Bridge with disposal at Columbia Ridge Landfill. Approval for this work was provided via an RBDA from USEPA dated December 20, 2012.

South Shoreline: Demolition of structures and excavation of contaminated soils, debris, and sediments from the South Shoreline with disposal at various landfills (this application).

Years 2–3 Dredging: Continuation of the dredging of the Plant 2 Corrective Measure. Application is expected to be submitted around June 1, 2013 for work beginning August 1, 2013. TSCA approval for this work is expected to be provided at a later date.

1.2 SITE BACKGROUND AND SETTING

Plant 2 is located at 7755 East Marginal Way South in Seattle and Tukwila, Washington (Figure 1). Plant 2 is bounded by the Duwamish Waterway to the west; Webster Street, Slip 4, and property owned by Crowley Marine Corporation to the north (excluding public streets and ways); the AIRGAS NOR PAC plant and East Marginal Way South to the east; and the Jorgensen Forge Company (Jorgensen Forge) to the south.

Plant 2 is composed of numerous buildings on approximately 107 contiguous acres. The areas between the buildings are mostly paved with asphalt or concrete, while some limited areas are landscaped. Sixteenth Avenue South traverses the center of Plant 2 in a north to south direction. Figure 1 shows the current layout of the Plant 2 property.

For purposes of the Corrective Measures, the project area is divided into the following three separate subareas (Figure 1):

- In-water dredging areas, consisting of the DSOA Sediment Cleanup Area and the Slip 4 Sediment Cleanup Areas
- North Shoreline Area

- South Shoreline Area, including the areas below the remaining overhanging building slabs and support pilings from the former 2-40s Buildings complex and the SW Bank

The boundary for the DSOA and SW Bank Corrective Measure is shown on Figure 1. The shaded areas on Figure 1 show the approximate boundaries where the proposed cleanup will be performed.

Soil/sediments in the three subareas of the DSOA and SW Bank have been found to be contaminated with elevated concentrations of some or all of the following: PCBs, metals (primarily cadmium, copper, lead, and zinc), volatile organic compounds (VOCs), and semivolatile organic compounds (SVOCs). A compilation of available data for sediments and soils for Plant 2 is presented in Appendix A of the Design Report.

Each of the three subareas is described in more detail below.

1.2.1 In-water Dredging Areas

The In-water Dredging Area represents the area where sediments will be removed using in-water, barge-mounted equipment. The In-water Dredging Area is contiguous to Plant 2 to the west along the Duwamish Waterway at approximately river mile (RM) 2.8 to 3.6 (Figure 2). The DSOA horizontal boundary was established in 2008 with USEPA's approval of the *Horizontal Boundary Technical Memorandum* (Geomatrix and FSI 2008).

The northern boundary of the DSOA In-water Dredging Area extends to the opening of Slip 4, while the southern boundary extends approximately 150 feet south of the Plant 2/Jorgensen Forge property line. Jorgensen Forge, under a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Order with USEPA, is performing a cleanup action that includes the banks starting at the Plant 2/Jorgensen Forge property line and the sediments beginning at the DSOA southern boundary.

The eastern boundary of the DSOA In-water Dredging Area is the toe of the slope along the shoreline, the 2-10 Building face, and the waterward edge of the slab overhang from the former 2-40s Buildings complex. The limit of in-water work will generally be set at an elevation of +2 feet relative to Mean Lower Low Water (MLLW). The western boundary extends at least to the Federal Navigation Channel along the length of the Plant 2 property. How far the DSOA extends into the Navigation Channel is a function of the depth of the dredge cut that is necessary for sediment removal at the edge of the boundary (the cut needs to be extended into the channel in order to create a stable cut slope). The configuration of the DSOA relative to the Navigation Channel is provided in the Design Report.

The In-water Dredging Area also includes four small areas within the Boeing-owned portion of Slip 4 (Figure 1).

Within the In-water Dredging Area are two Early Removal Areas offshore of the SW Bank with a combined volume of approximately 250 cy. These two areas contain one or more samples with PCB concentrations that exceed 50 ppm. They represent localized areas with elevated PCB concentrations that will be removed prior to the rest of the dredging action and handled separately. The SW Bank Offshore Early Removal Area is discussed in more detail in Section 2.0.

Approximately 36,000 cubic yards of the north In-water Dredging Area was completed during Year 1 of construction under the RBDA approval issued on December 20, 2012. The remaining in-water dredging (north and south) will be completed under a different RBDA. The RBDA application for Years 2 and 3 will be submitted to the USEPA's TSCA group by June 1, 2013.

1.2.2 North Shoreline Area

The North Shoreline Area lies on the northwestern corner of the Plant 2 property, adjacent to Slip 4 and Building 2-122 (Figure 2). This area does not require a TSCA approval as there was not a PCB release; however, a brief description has been included to provide a comprehensive discussion of the Project. Material is being excavated to create an embayment to serve as off-channel and riparian habitat. The design for the North Shoreline Area was optimized to address restoration goals. Although PCBs were detected in some locations in the North Shoreline Area, materials in which these PCBs are found do not meet the definition of PCB remediation waste. However, PCBs greater than 0.130 ppm will be removed as part of the Project. The soil/sediment removal area was defined based on restoration goals and is not based on a footprint of contamination.

The North Shoreline excavation work was initiated during Year 1 and will be completed during Year 2. As mentioned above, this work does not require a TSCA RBDA for the project and is not being conducted in accordance with requirements of 40 CFR 761.61.

1.2.3 South Shoreline Area

The South Shoreline Area generally encompasses the waterfront areas from the north end of the former Buildings 2-41, 2-44, and 2-49 (collectively referred to as the 2-40s Buildings complex) to the Jorgensen Forge property line.[1] Corrective Measures and habitat activities in the South Shoreline Area focus on the following:

- Demolition and removal of remaining structures, support pilings, and material in the area beneath the 2-40s Buildings complex (referred to as the Under-building Area).
- Removal of contaminated fill material from the SW Bank.
- Early removal of approximately 10 cy of sediment surrounding Outfall 12, located in the intertidal zone at the south end of Building 2-49 and adjacent to the SW Bank, which contains PCBs at concentrations greater than 50 ppm.
- Removal of material in the Shoreline Areas to comply with project-specific cleanup levels established under the RCRA Order, and establishment of the grades for a habitat restoration.
- Removal of large concrete debris located along the shoreline between the new 16th Avenue Bridge and the south end of the 2-10 Building.
- Habitat restoration.

[1] The specific southern boundary of the area is approximately 25 feet north of the southern property line where the SW Bank Corrective Measure abuts the Jorgensen Forge Outfall Site, where a separate PCB cleanup is being performed under CERCLA.

The South Shoreline work described above will be completed under this specific application for RBDA.

1.3 PERMITS

A number of permits, approvals, and processes will be required from local, state, and federal agencies to conduct the Project. A list of anticipated permits and regulatory approvals and processes required to complete the work is presented in Table 1 of the Design Report.

The Rivers and Harbors Act of 1899 (33 CFR 321-329) gives the United Stated Army Corps of Engineers (USACE) regulatory authority over construction activities in all navigable waters of the United States. Section 10 of this act is intended to protect these waters for purposes of navigation and general public benefit. This regulation is administered through the Section 10 Permit application process. Section 404 of the Clean Water Act (33 USC 1344) prescribes procedures to be followed before dredged or fill materials can be discharged into national water resources (including wetlands) and, as such, provides regulatory guidelines and permit requirements for dredging and filling activities. Administration of the requirements of Section 404 is vested in the USACE and is handled in conjunction with the Section 10 Permit process.

When both Section 10 and Section 404 (of the Clean Water Act) Permits are required, as is the case for the Project, they are typically considered and administered together by the USACE as a Section 10/404 Permit. Excavated materials within the Project area, regardless of construction sequencing (either dredged from barges in the Waterway or excavated with equipment from the shoreline), will be governed by the requirements of the Section 10/404 Permit and will be managed as "dredged material" per the provisions of the Section 10/404 Permit.

In practice, the shoreline excavation in most locations will begin at the toe of the slope and progress upward and inward removing contaminated bank sediments/soils. Soils along this cut are considered dredged material and will be part of the Section 10/404 Permit, as shown on Figure 2. The standard demarcation line between sediments and soil is customary high water; however, when shoreline work is being performed and the bank reshaped as described above, this definition changes as the bank topography changes. For this reason, the USACE Section 10/404 Permit includes soil, sediment, and debris that is dredged or excavated within the project footprint in its definition of dredged materials.

1.4 GENERAL RISK-BASED CONSIDERATIONS

The primary chemical of concern for the contaminated sediments and shoreline soils at Plant 2 is PCBs. To minimize or prevent worker exposure to PCB remediation waste to the extent practicable consistent with project objectives, the following Best Management Practices (BMPs) have been incorporated into this project:

1. Contractors and employees conducting work subject to this approval will be given notice that they are working with PCB-contaminated soils, sediments, debris, and structures.
2. Areas where PCB remediation waste will be handled will be clearly marked and BMPs will be used to prevent tracking of the materials into other areas of the site.

3. Contractors and employees that may come in contact with PCB remediation waste subject to this approval will wear long pants, long-sleeved shirts, and work gloves, as well as work boots that can be washed off. The purpose of these clothing requirements is to limit the amount of dermal contact with the soils/sediments, and to prevent track-out of PCBs. When working in areas with PCB concentrations greater than 50 ppm (unless the material is in closed containers), workers will additionally wear tyvek suits that include boot covers and disposable gloves.
4. No food or drink will be allowed in the active work area where direct contact with PCB remediation waste is reasonably possible.
5. A track-out area will separate active work areas from other areas at the facility (such as office areas). This area will contain the equipment appropriate to wash off boots, and discard gloves (or store for later use) before moving to other areas of the facilities.
6. Gross spills/drips that occur outside the designated PCB remediation waste stockpile areas will require immediate cleanup of the spilled sediments/soils to restore a visually clean area.

To further protect human and ecological communities along the transportation route between the site and the landfill(s), the following BMPs will be required:

1. No drips or spills on vehicles (trucks or rail cars) leaving the active area of the facility.
2. Visually clean truck wheels and undercarriages (as they leave the loading areas; nothing in this plan is intended to address road dirt picked up in transport).
3. Visually clean rail wheels and carriages (as they leave the loading areas; nothing in this plan is intended to address dirt that accumulates on the cars while in transit).

1.5 HEALTH AND SAFETY

The Project will be conducted in accordance with site-specific Health and Safely Plans (HASPs) for Boeing, the field engineering team (AMEC and Dalton, Olmsted & Fuglevand [DOF]) and the environmental contractor. Under the HASPs, workers will wear appropriate personal protective equipment. A daily safety briefing will be performed prior to any field work.

2.0 Site-specific Risk-based Toxics Substances Control Act Approval Request for South Shoreline Work

PCBs are regulated under TSCA in addition to their regulation under other statues. Under the TSCA regulations, an RBDA is the best approach for cleanup of PCB remediation waste and includes PCB-contaminated sediments at Plant 2. The Project includes localized areas where PCB concentrations are greater than 50 ppm and multiple shoreline areas where the distinction between sediments and soil is not meaningful during excavation.

For these reasons, Boeing previously requested a single, project-wide risk-based approval under TSCA that would cover all materials that meet the definition of PCB remediation, including both the materials with PCB concentrations greater than 50 ppm and the materials with PCB concentrations less than 50 ppm, and would apply to sediment, soils, demolished structure, accumulated water from within the structures, and incidental debris. USEPA has proposed that the "site-wide" approach be modified slightly to include three separate risk-based disposal approvals: one for Year 1 dredging (complete, final close-out pending); one for the South Shoreline excavation work during Year 2; and a final one for the dredging of sediments in Years 2 and 3. These approvals are coordinated with the Project approval from the USEPA's RCRA Group and the USACE's Section 10/404 Permit approval. The TSCA RBDAs will rely on RCRA's process to define the removal action requirements and subsequent monitoring and will rely on the USACE process to define materials handling procedures within the project area. The TSCA RBDAs address the evaluation of the handling and disposal of PCB-remediation wastes throughout the project elements. Boeing is requesting that the EPA provide written RBDA's to document that the overall action will also meet TSCA requirements, including disposal requirements.

From a TSCA standpoint, the South Shoreline elements of the Project include the following items, which will be completed consistent with 40 CFR Part 761.61:

- Excavation of approximately 10 cy of PCB-contaminated sediments that include concentrations greater than 50 ppm from the intertidal area at historical Outfall 12.
- Demolition of the remaining structures in the South Shoreline, including the overwater structures of the 2-40s Buildings complex, support structures and pilings, RCRA units, structures, and stormwater lines. Known structures have been characterized for disposal; however, three of these concrete structures require additional testing after they become more accessible. Two of these, the stretch press pit and the underflow flume, are expected to contain PCB contamination and may require disposal in a TSCA landfill as discussed further in Section 3.0. Structure demolition will also include the removal and discharge of accumulated water from within the structures. This water has been tested and will be discharged in accordance with the Boeing Plant 2 King County Permit for industrial discharge. Water from the stretch press pit and underflow flume will require treatment prior to discharge.
- Excavation of approximately 35,000 cy soil/sediment (considered dredged material per the USACE permit) and contouring the South Shoreline bank. This task would also consist of management of return water from the dredged material.
- Transportation of the material to approved disposal sites.

- Disposal of the dredged material containing PCBs at concentrations both greater than and less than 50 ppm as PCB-remediation waste.

Dredged material with PCB concentrations less than 50 ppm and with the appropriate soil-like characteristics may be used as alternative daily cover or for beneficial reuse at a RCRA Subtitle D landfill. It should be noted that all of these elements also require approval from USEPA under the RCRA Order, and that all shoreline excavation and dredging actions will be completed under the Section 10/404 Permit.

A frequency of total PCBs detected in each area is included in Table 1, and a summary of total PCB concentrations in these areas is included in the Table 2 series (Tables 2a through 2c). The sample locations are shown on the Figure 3. In addition, Figure 3 also includes a summary of data with PCB concentrations greater than 10 ppm and the sample depths that will be removed as part of the Corrective Measures.

3.0 Materials with PCB Concentrations Greater than 50 ppm

Since 1994 there have been over 20 sediment and shoreline investigations conducted at and adjacent to Plant 2. During these investigations, three locations within the overall project footprint have been identified as having PCB concentrations greater than 50 ppm: the nearshore area associated with Outfall 12 and two offshore sediment areas adjacent to the SW Bank. The Outfall 12 area is close enough to shore that an excavator can be used to remove these sediments and is part of this RBDA. The two areas offshore the SW Bank with sediment PCB concentrations greater than 50 ppm are far enough from the bank they will be excavated by a barge-mounted dredge, and will be covered under the Year 2 and 3 dredging RBDA.

PCB sample results for the Outfall 12 Early Removal Area are summarized in Table 2c and sample locations are shown on the Figure 3.

3.1 OUTFALL 12 EARLY REMOVAL AREA

Outfall 12 discharged to the intertidal zone along the bank at the south end of Building 2-49, adjacent to the SW Bank (Figure 4). An interim measure (IM) at Outfall 12 was designed to specifically remove sediments and bank soils with elevated concentrations of PCBs (Weston 1998). Prior to the completion of this IM, Weston collected two surface (0–2 inches) and two subsurface (8–12 inches) samples to pre-define the area of excavation so that the work could be done during a single low-tide period (approximately 6 hours). In addition, pre-excavation analytical sample results were compared to PCB field test kit measurements to evaluate if the test kits would be appropriate for use during excavation. The pre-sampling comparison indicated that the use of field test kits for PCBs would be appropriate based upon a relatively accurate pre-excavation correlation between the field test kits and actual analytical results for PCBs. Approximately 22 tons of sediments were removed from an area approximately 10 feet by 12 feet, to a depth of 2 to 3.5 feet. Confirmatory sediment samples were collected after the excavation reached the target depths, and field test kit results indicated that PCB concentrations were less than 50 ppm. The excavation was subsequently lined with geotextile fabric and backfilled with clean fill (within the 6-hour tidal window for the excavation); however, a confirmatory lab sample that was collected in disturbed sediments at the bottom of the excavation contained concentrations greater than 50 ppm.

In June 2001, nine sediment cores were collected in the vicinity of Outfall 12, two of which were installed within the horizontal limits of the IM excavation to confirm the results of the 1998 IM (Pentec and FSM 2001). The results of these two samples indicated that PCBs were detected between 0.044 ppm and 5.5 ppm at depths between 4 and 6 feet below the mud line (just below the vertical limits of the 1998 IM excavation). One sediment sample collected at the surface (DUW99), just outside the vertical limits of the IM excavation, contained PCBs at a concentration of 51 ppm. PCB concentrations in other sediment samples collected outside the limits of the IM excavation were substantially less than 50 ppm, with an average concentration less than 10 ppm. Refer to Figure 4 for the PCB concentrations in sediment in the Outfall 12 area.

3.1.1 Early Removal Action Scope

The goal of the Outfall 12 Early Removal Action is to remove sediments with PCB concentrations greater than 50 ppm from the area before the area is further excavated to a RCRA-approved removal action limit of 0.130 ppm. To be conservative, sediments with PCB concentrations greater than 25 ppm in this area will be removed as part of this Early Removal Action.

This will be accomplished by removing approximately 10 cy of sediments within a single low tide cycle, using excavation equipment that will work from the shoreline. The Early Removal Area is approximately 7 feet by 8 feet, to a maximum depth of 3 feet below the mud line, as shown in plan view and cross-section on Figure 4. The volume of sediment within this area is estimated to be less than 7 cy, or approximately 11 tons, and will require special handling. This material will be excavated and segregated from the Outfall 12 area prior to the initiation of the dredging and shoreline excavation in this area. Because the volume of sediment with PCB concentrations greater than 50 ppm is limited in this area and is located near shore, it is expected that the removal action will consist of excavation using an on-shore excavator during low tide.

The sediments will be handled as discussed in Section 3.3.

3.2 STRUCTURES AND OUTFALL TESTING, HANDLING, AND DISPOSAL

Two concrete structures, the stretch press pit and the underflow flume, are known to be contaminated with PCBs, but will not be easily accessible prior to demolition due to size, location, and limited access to the interior. Refer to the Figure 5 series (Figure 5a through 5d) for the location and relative size of these structures. During the demolition activities, these large concrete structures will be broken up to manageable pieces and lifted by crane or specialized forks attached to an excavator. This work will be conducted during low tide, such that the work will be conducted in the dry unless an alternative acceptable approach is developed by the contractor. The concrete from the stretch press pit and underflow flume will be segregated in the TSCA cell of the Hazardous Materials Stockpile and tested for disposal characterization. If PCB concentrations are greater than 50 ppm, the concrete from the structure(s) will be managed in accordance with requirements detailed in Section 3.4. If PCB concentrations are less than 50 ppm, the concrete will be managed in accordance with Sections 4.5 and 4.6 and disposed of as solid waste at a Subtitle D landfill.

In addition, several former outfalls are possible PCB sources and will be segregated, inspected, and tested prior to disposal. Refer to the Figure 5 series for the locations and designations. Of these outfalls, Outfalls X and Y have had known PCB contamination and will be segregated and disposed of as PCB remediation waste with concentrations greater than 50 ppm.

3.3 HANDLING AND DISPOSAL FOR MATERIALS WITH PCBS GREATER THAN 50 PPM

The materials from the Early Removal Areas (PCB concentrations greater than 50 ppm) are expected to be handled as follows, consistent with 40 CFR 761.61:

- Excavated material from the Outfall 12 Early Removal Area will be excavated and loaded into articulated off-road trucks, which will transport the material to the

designated cell for PCB remediation waste greater than 50 ppm within the Hazardous Materials Stockpile Area, or loaded directly into water-tight intermodal containers placed in a bermed and lined area to capture incidental spillage.

- Drying agents will be added and mixed with the material, as necessary, to stabilize the moisture content prior to shipping; this may be done either in the containers or in the TSCA cell of the Hazardous Materials Stockpile. Sufficient drying agents may be added to ensure no visible free liquids are present prior to shipment for off-site disposal.
- Water from the Hazardous Materials Stockpile area will be collected, pre-treated on-site, and disposed to the Publicly Owned Treatment Works (POTW) after testing to confirm that it meets the POTW discharge requirements. Such water will include rainfall and water that may accumulate on top of the soils/sediments after placement in the Stockpile Area.
- PCB-impacted materials with concentrations greater than 50 ppm will be transported to a permitted landfill in containers that meet the requirements of the Department of Transportation Hazardous Materials Regulations at 49 CFR parts 171 through 180 (refer to 40 CFR 761.61(5)(i)(B)).
- The soils/sediments excavated during the Outfall 12 Early Removal Action and structures, if any, that contain PCBs at concentrations greater than 50 ppm must be disposed in a hazardous waste landfill permitted by USEPA under Section 3004 of RCRA or by a state authorized under Section 3006 of RCRA, or disposed in a PCB disposal facility approved under 40 CFR Part 761.
- The containers may be decontaminated consistent with 40 CFR 761.79 and reused in accordance with 40 CFR 761.30(u). Alternatively, the containers do not need to be decontaminated if the landfill can demonstrate that all PCB remediation waste remained within the liner during the unloading process and did not contact the container itself (generally due to the materials being placed in the landfill while still wrapped in the liner).
- Material with PCB concentrations greater than 50 ppm must be shipped off-site using an appropriate manifest (e.g., Uniform Hazardous Waste Manifest), and a signed copy of each manifest must be retained for a period of 3 years in accordance with 40 CFR 761.209(a).
- Additional recordkeeping requirements that document the cleanup for material with PCB concentrations greater than 50 ppm (such as dates, removal locations and depths, volumes, etc.) will be completed in accordance with 40 CFR 761.61 (a)(9) and 761.79(f).

4.0 Materials with PCB Concentrations Less than 50 ppm

Approximately 35,000 cy of material with PCB concentrations less than 50 ppm (the typical average PCB concentration is less than 1 ppm) will be removed by land-based excavation from the South Shoreline as part of this Project under the USACE Section 10/404 Permit and the RCRA Order, and will be managed consistent with 40 CFR Part 761 and in accordance with the conditions of the requested RBDA. A summary of total PCB concentrations is included in Tables 2a and 2b, and the area and sample locations are shown on Figure 3. Additionally, a frequency of total PCBs detection summary is included in Table 1.

The South Shoreline area construction involves demolition of structures associated with the former 2-40s Buildings complex, piling removal, utilities removal, and excavation of the shoreline. The former 2-40s complex concrete slab overhang is being disposed of under the self-implementing procedure, consistent with the letter dated April 9, 2013 submitted to the EPAs TSCA group by Boeing. Once these activities are complete, natural habitat will be restored at the shoreline. General methods of construction are described in the following subsections; the actual methods may differ based on the contractor's approach.

4.1 DEMOLITION OF SHORELINE STRUCTURES

Several structures remain in the subsurface along the shoreline in the Under-building Area (refer to the Figure 5 series for locations of known structures). As part of Plant 2 demolition activities, accessible structures were inspected and numerous samples were collected to assess current conditions. A summary of known structures and testing requirements is included as Table 3. A thorough assessment was completed to identify additional sampling requirements prior to demolition. Based on the assessment, three structures were identified (stretch press pit, underflow flume, and trichloroethylene degreaser) for segregation and testing prior to disposal. Two of these concrete structures, as discussed in Section 3.2, must be segregated and tested for PCBs prior to disposal.

The remaining structures will be demolished and removed prior to or concurrent with the shoreline excavation. In addition, several of these structures contain accumulated water, which will be removed prior to demolition, treated if necessary, and discharged to the POTW. During the demolition activities, several large concrete structures will be broken up to manageable pieces and lifted by crane or specialized forks attached to an excavator. This work will be conducted during low tide, such that the work will be conducted in the dry unless an alternative acceptable approach is developed by the contractor. The concrete will be managed in accordance with Sections 4.5 and 4.6 and disposed of as solid waste at a Subtitle D landfill.

4.2 PILING DEMOLITION

Once the slab overhang and other structures below the slab are removed, pilings, piling clusters, and piling caps will be removed. Piling clusters may consist of multiple, closely spaced timber pilings (i.e., pilings located within three piling diameters of one another). Complete removal of the piling clusters with five or more piles could loosen the surrounding soils and adversely impact the overall stability of the area, especially during an earthquake, as a result of liquefaction and lateral spreading. Therefore, these piling clusters will be cut off at the sediment/soil excavation surface or at least 3 feet below the final grade, whichever is deeper.

Individual pilings, if present, will be removed, if practicable. If individual pilings cannot be removed, then they will be cut off at the sediment/soil excavation surface or at least 3 feet below the final grade, whichever is deeper.

Representative samples of structural concrete and wood pilings will be sampled and profiled prior to disposal as solid waste at a Subtitle D landfill. PCB detections are expected to be incidental and low (substantially less than 50 ppm) due to prolonged direct contact with subsurface PCB-containing sediment. The pilings and piling caps themselves are not sources of PCBs and the piling portions that will be left in place post-excavation will not be in contact with PCB-containing material; therefore, they are not considered PCB remediation waste.

4.3 EXISTING UTILITIES REMOVAL

Known and suspected subsurface features in the South Shoreline Area are presented on design plans included in the Final Design Report package. The Utilities Underground Location Center (a one-call utility locating service) will be contacted by the contractor to identify utilities prior to any subsurface work. In addition, a private utility locate survey will be conducted to verify the location of all known utilities. Known active utilities consist of one outfall (Outfall "Z") and four temporary stormwater overflow pipes (Outfalls L, O, Q, and V) that will be removed during the South Shoreline work.

All inactive, existing utilities within the project limits will be removed either before or during the shoreline earthwork or demolition. Those inactive utilities include several outfalls, drain lines, and fire lines. The former outfalls are shown on the Figure 5 series, several of which have been identified for segregation and testing prior to disposal (refer to Table 3). Utility work will be conducted during low tide, in the dry, as much as possible.

4.4 SHORELINE EXCAVATION

Shoreline excavation will be completed in compliance with the USACE Section 10/404 Permit and will proceed from upstream to downstream, in strips perpendicular to the Duwamish Waterway main channel. Excavation along the immediate shoreline and tidal flats will be performed during low tide, as required by the USACE Section 10/404 Permit, to minimize sediment discharge into the Duwamish Waterway and to limit the amount of water generated during excavation. In addition, engineering controls, such as silt curtains, will also be in place during excavation to minimize sediment discharge into the Duwamish Waterway. The lateral extent of excavation and grading in any given day will be limited by the tides. The excavation surfaces will be backfilled with at least 6 inches of granular backfill (obtained from a USEPA-approved clean borrow source[2]) at the end of each work/tide period, or the surface shall be protected with other means. Long-reach, tracked excavators will be used to access the full width of the shoreline excavation from the top of the bank. Work will progress in sections that extend from the dredge line at the approximate toe of the shoreline slope (elevation +2 feet MLLW) landward to the approximate top of the slope. Overlap of each subsequent section will be performed so that all existing soil within the planned excavation is removed.

[2] The fill criteria for PCBs are 0.03 ppm (intended to represent "not detected" at a Practical Quantitation Limit (PQL) of 0.03 ppm) as presented in Table 3.1 of Appendix 3 of the USEPA-approved Request for Approval of Quarry Sites (USEPA 2012a).

Excavation of the shoreline slope will be performed using standard earthwork equipment. Numerous potential obstructions may be encountered within this portion of the work area. These obstructions could include logs, debris, pilings, and various other undocumented structures. Excavated debris and other obstructions will be removed and transported off-site.

Precautionary measures will be taken during excavation adjacent to several existing site features, such as the sheet pile containment wall and the southernmost stormwater bioswale.

Excavation activities adjacent to the stormwater bioswales will utilize temporary slopes inclined at 1.5H:1V with a 10-foot-wide berm left between the top of the bioswale and the top of the temporary cut slope to minimize potential destabilization.

Long-reach, tracked excavators may be required to access the full width of the shoreline excavation from the top of the berm. Temporary cut slopes will be on the order of 4H:1V or flatter to minimize the potential for sloughing. Additional measures may be required if substantial seepage is encountered that results in continual piping and sloughing of the excavated surface. These measures could include placement of a gravel drainage blanket or geotextile fabric and sandbags over the seepage area to protect the area from continued sloughing and erosion, and to transmit the seepage to the toe of slope. To satisfy final grading requirements, the drainage blanket would need to be installed sufficiently deep to accommodate the minimum 2-foot-thick sand backfill. Because of variable excavation depths along the length of the work area, temporary sloping of the excavation sidewalls to a stable, temporary configuration will increase the volume of material removed. Where temporary cut slopes could potentially destabilize existing structures scheduled to remain, temporary shoring using sheetpiles may be required.

4.5 ON-SITE HANDLING FOR MATERIALS WITH PCBS LESS THAN 50 PPM

The materials with PCB concentrations less than 50 ppm are expected to be handled as follows consistent with 40 CFR 761.61; further details are available in the attached Stockpile Management Plan (Appendix A; Envirocon 2013):

- Excavated soil/sediments, debris, and construction and demolition will be excavated and loaded into articulated off-road trucks, which will transport the materials to the designated bermed stockpile: either the Hazardous Waste/uncharacterized stockpile area or the non-hazardous/Subtitle D stockpile. The stockpile designation depends on the presence of leachable lead, not PCB concentrations.
- Water may accumulate in any of the bermed stockpile areas as the wet materials continue to drain after excavation. Boeing will pump this water off the sediments prior to stabilization to the extent practicable without excessive introduction of solids into the corresponding wastewater treatment plant. If so, it will be collected and pre-treated on-site as follows:
    - Water from the hazardous and uncharacterized stockpiles will be treated at the RCRA Treatment Plant, and disposed to the POTW after testing to confirm that it meets the POTW discharge requirements.[3]

[3] Return water from other areas with lower PCB concentrations will be treated on-site and discharged to the waterway under the USACE permit, including Ecology's 401 Water Quality Certification. It is only the return water from the Early Removal Areas with elevated PCBs that will be treated and then discharged to the POTW.

  - Water from the non-hazardous (Subtitle D) stockpile will be treated at the Dredge Return Water Treatment Plant and returned to the waterway after testing to confirm that it meets the water quality requirements of the Section 10/404 Permit and its accompanying water quality certification (which are more stringent than the TSCA requirements).

- Drying agents will be added and mixed with the material, as necessary, to stabilize the moisture content prior to shipping. Sufficient drying agents may be added to ensure no visible free liquids are present prior to shipment for off-site disposal.
- Any spills or releases in the Stockpile loading area will be cleaned up immediately to remove visible evidence of the spill or release.

4.6 TRANSPORTATION OF MATERIALS

Materials going to a Subtitle D landfill will be transported to the landfill by intermodal containers or truck and trailer. The intermodal containers would be loaded at Plant 2, moved by truck to a transfer station, and then transferred to rail car and transported by train to the landfill.

The trucks and trailers will be lined to prevent any loss of liquids (residual dredge return water) during transport and covered to prevent the loss of dust and debris. The trucks and trailers will be dedicated to the Project until no longer needed, at which point they will be decontaminated to meet a visually clean debris surface in accordance with 40 CFR 268.45, Table 1, footnote 3. Solids generated during decontamination will be disposed at a solid waste landfill; water generated during decontamination will be treated at the RCRA Treatment Plant at Plant 2.

The intermodal containers will be handled in slightly different manners depending on the Solid Waste Landfill used. All options are required to include the following:

- The containers will be lined or water-tight to prevent the loss of incidental water during transport.
- The containers will be covered or closed (if they contain lids) to prevent the loss of dust and debris during transport.
- The containers will be cleaned after use to meet a visually clean debris surface in accordance with 40 CFR 268.45, Table 1, footnote 3. The intermodal containers do not need to be cleaned if they remain dedicated to this project or if the landfill can demonstrate that all PCB remediation waste remained within the liner during the unloading process and did not contact the container itself (generally due to the materials being placed in the landfill while still wrapped in the liner.)

4.7 DISPOSAL OF PCB-REMEDIATION WASTES WITH CONCENTRATIONS LESS THAN 50 PPM

For disposal purposes, materials with PCB concentrations less than 50 ppm have been divided into three major waste streams:

- Concrete structures and other concrete or debris with PCB concentrations less than 50 ppm will be disposed as solid waste at a Subtitle D landfill.

- Soils, sediments, and debris that exhibit the toxicity characteristic for lead pursuant to Washington Administrative Code (WAC) 173-303-090 for lead will be segregated and disposed as hazardous waste at a Subtitle C landfill. This material also contains low levels of PCBs (concentrations substantially less than 50 ppm).
- Other soils and sediments will be disposed as solid waste at a Subtitle D landfill. Because much of this material will be damp, it may be beneficially reused by the landfill (moisture is needed to facilitate production of landfill gas for the co-generation facilities at many solid waste landfills). If the soils and sediments qualify for use as Alternative Daily Cover at the landfill, then the soils and sediments may be used as Alternative Daily Cover as well.

5.0 References

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Boeing Plant 2

TSCA Risk-based Disposal Application

Tables

FINAL

Table 1
Frequency of Detection for Total PCBs by Area[1]

Area	Number of Results	Number of Detects	Percent Detects	Minimum Detected Value (ppm)	Maximum Detected Value (ppm)	Location of Maximum Detect	Date of Maximum Detect	Depth of Maximum Detect	Number of Non-detects	Percent Non-detect	Minimum Non-detected Value (ppm)	Maximum Non-detected Value (ppm)
SW Bank	161	106	66%	0.018	23	SD-SWY03	6/13/1995	0–0.3 ft	55	34%	0.019	0.16
2-40s Underbuilding	52	15	29%	0.68	17	SD-04109	4/17/1995	0–0.3 ft	37	71%	0.03	0.084
Early Removal Area—Outfall 12	2	2	100%	25	51	SD-DUW99	6/19/2001	0–0.9 ft	0			

Note:

1 Total PCB Concentrations are presented in parts per million (ppm) or milligram per killogram (mg/kg).

Abbreviations:

cm Centimeter
ft Feet
PCB Polychlorinated Biphenyl
SW Bank Southwest Bank
TSCA Toxic Substances Control Act

Table 2a
Summary of Total PCB Concentrations—SW Bank Area

Sample Location	Sample Date	Sample Depth (ft bgs)	Total PCB Concentration (ppm)
2-40-DP-009	7/7/2008	0–1	0.032 U
2-40-DP-009	7/7/2008	4–5	0.033 U
2-40-DP-009	7/7/2008	9–10	0.032 U
DP-4902	9/4/2002	6–6.4	0.068 U
DP-4902	9/4/2002	9–10.5	0.07 U
DP-4902	9/4/2002	13.5–14	0.082 U
DP-4903	9/4/2002	5–5.7	0.07 U
DP-4903	9/4/2002	10–11	0.075 U
DP-4903	9/4/2002	14–14.5	0.082 U
DP-4904	9/4/2002	6–6.4	0.164
DP-4904	9/4/2002	9.5–10.5	0.072 U
DP-4904	9/4/2002	13.5–14.5	0.083 U
DP-4905	9/4/2002	6–6.3	0.073 U
DP-4905	9/4/2002	9–10.3	0.071 U
DP-4905	9/4/2002	12.5–13.5	0.082 U
PL2-013B	7/31/2006	1–1	0.14
PL2-013B	7/31/2006	5–5	0.033 U
PL2-013B	7/31/2006	10–10	0.033 U
PL2-014AR	7/31/2006	1–1	0.41
PL2-014AR	7/31/2006	5–5	0.033 U
PL2-014AR	7/31/2006	10–10	0.033 U
PL2-015BR	8/1/2006	1–1	0.046 J
PL2-015BR	8/1/2006	5–5	0.22 J
PL2-015BR	8/1/2006	10–10	0.033 U
PL2-036A	10/26/1994	2–2	9.8
PL2-036A	10/26/1994	7.5–7.5	3 D
PL2-036A	10/26/1994	12.5–12.5	0.087
PL2-036B	8/2/2006	1–1	0.112
PL2-036B	8/2/2006	5–5	0.032 U
PL2-036B	8/2/2006	10–10	0.032 U
PL2-037A	10/26/1994	2–2	0.22
PL2-037A	10/26/1994	7.5–7.5	0.076
PL2-037A	10/26/1994	10–10	0.045
PL2-038A	2/20/1995	18.5–18.5	0.022 J
PL2-038A	2/20/1995	23–23	0.08
PL2C-2-60X-D-DP-S	2/27/2007	0.5–1.5	0.082 J
PL2C-2-60X-D-DP-S	2/27/2007	4–5	0.094
PL2C-2-60X-D-DP-S	2/27/2007	9–10	0.05 Y
PL2C-2-60Y-F-DP-S	2/27/2007	0.5–1.5	0.4
PL2C-2-60Y-F-DP-S	2/27/2007	4–8	1.68 J
PL2C-2-60Y-F-DP-S	2/27/2007	9–10	0.75
SB-04901	11/24/1993	2–2	0.061 J
SB-04901	11/24/1993	5–5	0.16 U
SB-04901	11/24/1993	12.5–12.5	0.16 U
SB-04901	11/24/1993	16.5–16.5	0.16 U
SB-04910	8/12/1994	5–5	0.042 J
SB-04910	8/12/1994	7.5–7.5	0.072 U
SB-04910	8/12/1994	10–10	0.08 U
SB-04914	7/20/1995	4–4	1.88
SB-04915	7/20/1995	3.5–3.5	0.035 U
SB-04915	7/20/1995	7.5–7.5	0.036 U
SB-04915	7/20/1995	10.5–10.5	0.036 U
SB-04916	8/8/1995	2.5–2.5	0.022 J
SB-04916	8/8/1995	7.5–7.5	0.468
SB-04916	8/8/1995	10–10	0.226
SB-04917	7/12/2001	5.5–7	0.023
SB-04918	7/12/2001	7–8.5	0.039 U
SB-04919	7/12/2001	10–11.5	0.018
SB-06616	8/15/1994	0.5–1.5	0.56
SB-06616	8/15/1994	3.5–4.75	0.114 J
SB-06616	8/26/1994	11–11.5	0.59
SB-06624	8/15/1994	1–1.25	0.32
SB-06624	8/15/1994	2.5–3.25	2.42
SB-06624	8/26/1994	5–5.75	0.081 J
SB-06627	7/12/2001	5.5–7	0.038 U
SB-06628	7/11/2001	13–14.5	0.089
SB-06629	7/11/2001	7–8.5	0.036 U
SB-06630	7/11/2001	9–10.5	0.037 U
SB-06631	7/11/2001	7–8.5	0.039 U
SB-06632	7/11/2001	8.5–10	0.036 U
SB-06633	7/11/2001	7–8.5	1.6
SB-06633	7/11/2001	10–11.5	1.18
SB-06633	7/11/2001	11.5–13	0.233
SB-06633	7/11/2001	13–14.5	0.44
SB-06634	7/10/2001	7–8.5	0.037 U
SB-06635	7/10/2001	7–8.5	0.037 U
SB-06636	7/10/2001	7–8.5	0.15
SB-06636	7/10/2001	8.5–10	0.13
SB-06637	7/10/2001	10–11.5	0.405
SB-06637	7/10/2001	11.5–13	0.071
SB-06638	7/10/2001	5.5–7	0.036 U
SB-06639	7/10/2001	7–8.5	0.036 U
SB-06640	7/10/2001	7–8.5	0.51
SB-06640	7/10/2001	8.5–10	0.25
SB-06640	7/10/2001	10–11.5	0.195
SB-06641	7/9/2001	8.5–10	0.184
SB-06642	7/9/2001	5.5–7	0.038 U
SB-06643	7/9/2001	7–8.5	0.037 U
SB-06644	7/9/2001	7–8.5	0.33 J
SB-06644	7/9/2001	8.5–10	0.102

Table 2a
Summary of Total PCB Concentrations—SW Bank Area

Sample Location	Sample Date	Sample Depth (ft bgs)	Total PCB Concentration (ppm)
SD-04402	6/15/1995	0–0.3	0.19
SD-04402	6/15/1995	0.3–1	0.6
SD-04404	6/14/1995	0–0.3	0.4
SD-04405	6/14/1995	0–0.3	0.173
SD-04405	6/14/1995	0.3–1.5	0.12
SD-04406	6/15/1995	0–0.3	1.1
SD-04901	2/16/1995	0–0.3	3.77
SD-04901	2/16/1995	0.3–1.5	0.35
SD-04901	2/16/1995	1.5–3	0.066 J
SD-04902	2/16/1995	0–0.3	2.1
SD-04902	2/16/1995	0.3–1.5	0.37
SD-04902	2/16/1995	1.5–3	0.25
SD-04903	2/16/1995	0–0.3	0.283
SD-04903	2/16/1995	0.3–1.5	2.96
SD-04903	2/16/1995	1.5–3	2.53
SD-04904	2/17/1995	0–0.3	10.18
SD-04904	2/17/1995	0.3–1.5	8.26
SD-04904	2/17/1995	1.5–3	10 J
SD-04904	2/17/1995	1.5–3	18 J
SD-04906	2/17/1995	0–0.3	2.8
SD-04907	2/16/1995	0–0.3	0.58
SD-04908	2/16/1995	0–0.3	2.3
SD-04909	2/17/1995	0–0.3	0.22
SD-04910	2/17/1995	0–0.3	0.46
SD-04911	2/16/1995	0–0.3	0.326
SD-04912	2/17/1995	0–0.3	0.38
SD-04913	2/17/1995	0–0.3	0.13
SD-04914	2/17/1995	0–0.3	0.5
SD-04917	2/16/1995	0–0.3	5.96 J
SD-04917	2/9/1995	18–18	0.041 U
SD-04917	2/9/1995	23–23	0.041 U
SD-04918	2/16/1995	0–0.3	0.408
SD-04919	2/9/1995	18–18	0.042 U
SD-04919	2/9/1995	23–23	0.042 U
SD-04920	6/15/1995	0–0.3	2.3
SD-04920	6/15/1995	0.3–2	0.95
SD-04922	6/15/1995	0–0.3	4.8
SD-DUW102	6/4/2001	0–0.6	1.08
SD-DUW102	6/4/2001	1–2	0.59
SD-DUW102	6/4/2001	2–3.3	0.037
SD-DUW103	6/5/2001	0–0.7	1.58
SD-DUW103	6/5/2001	1–1.7	0.61
SD-DUW103	6/5/2001	2–2.6	0.035 U
SD-DUW94	6/5/2001	4–5	5.5
SD-DUW94	6/5/2001	5–6	0.31
SD-DUW96	6/19/2001	4–5	6.4
SD-DUW96	6/19/2001	6–6.7	0.044
SD-DUW96	6/19/2001	8–8.6	0.025
SD-DUW97	6/19/2001	2–3	3.3
SD-DUW97	6/19/2001	4–5	0.035 U
SD-DUW97	6/19/2001	6–6.7	0.036 U
SD-DUW98	6/18/2001	2–3	0.036
SD-DUW98	6/18/2001	4–5	0.04 U
SD-DUW98	6/18/2001	6–7	0.039 U
SD-DUW98	6/18/2001	8–8.5	0.036 U
SD-DUW118	6/7/2001	2–2.7	0.045
SD-DUW118	6/7/2001	4–4.7	0.039 U
SD-DUW118	6/7/2001	6–6.5	0.035 U
SD-SWY02	6/13/1995	0–0.3	2.27
SD-SWY03	6/13/1995	0–0.3	23.4 J
SD-SWY04	6/13/1995	0–0.3	1.4
SD-SWY09	6/14/1995	0–0.3	2.08
SD-SWY13	6/14/1995	0–0.3	0.188
SD-UB-017	7/10/2008	1.5–3	0.046
SD-UB-017	7/10/2008	3–4.5	0.12
SD-UB-017	7/10/2008	4.5–6	0.02
SD-UB-018	7/9/2008	2–3	0.02 U
SD-UB-018	7/9/2008	3–4	0.02 U
SD-UB-018	7/9/2008	4–5	0.019 U
SS-SWY01	3/24/1995	0–0.3	0.33
SS-SWY02	3/24/1995	0–0.3	3.5
SS-SWY04	4/19/1995	0–0.3	2.1
SS-SWY05	4/19/1995	0–0.3	1.8
SS-SWY06	4/19/1995	0–0.3	1.6
		Mean	1.1
		Maximum	23

Abbreviations:

ft bgs Feet below ground surface
PCB Polychlorinated biphenyl
ppm Parts per million
SW Bank Southwest Bank

Qualifiers:

D Dilution
J Estimated value
U Not detected at concentration greater than the laboratory method detection limit
Y Elevated reporting limit due to mixture overlap

Table 2b
Summary of Total PCB Concentrations—Under-building Area

Sample Location	Sample Date	Sample Depth (ft bgs)	Total PCB Concentration (ppm)
2-31-DP-50	9/9/2009	0–1	0.03 U
2-31-DP-50	9/9/2009	4–5	0.03 U
2-31-DP-50	9/9/2009	9–10	0.032 U
2-40-DP-007	7/3/2008	0–1	0.03 U
2-40-DP-007	7/3/2008	4–5	0.03 U
2-40-DP-007	7/3/2008	9–10	0.032 U
2-40-DP-008	7/3/2008	0–1	0.032 U
2-40-DP-008	7/3/2008	4–5	0.031 U
2-40-DP-008	7/3/2008	9–10	0.031 U
2-40-DP-037	5/22/2008	0–1	0.033 U
2-40-DP-037	5/22/2008	4–5	0.033 U
2-40-DP-037	5/22/2008	9–10	0.032 U
2-40-DP-040	5/15/2008	0–1	0.033 U
2-40-DP-040	5/15/2008	4–5	0.033 U
2-40-DP-040	5/15/2008	9–10	0.032 U
2-40-DP-043	5/12/2008	0–1	0.032 U
2-40-DP-043	5/12/2008	4–5	0.033 U
2-40-DP-043	5/12/2008	9–10	0.033 U
P2IM-DB-016	7/16/2010	10–10	0.032 U
P2IM-DB-018	7/16/2010	5–5	0.032 U
P2IM-DB-022	7/15/2010	12–12	0.032 U
P2IM-DB-023	7/15/2010	6–6	0.032 U
SD-04101	3/21/1995	0–0.3	1.8
SD-04102	3/21/1995	0–0.3	8
SD-04103	3/21/1995	0–0.3	1.6
SD-04104	3/21/1995	0–0.3	4.1
SD-04105	3/21/1995	0–0.3	2
SD-04109	4/17/1995	0–0.3	17.3
SD-04110	4/17/1995	0–0.3	1.3
SD-04111	4/17/1995	0–0.3	2.4
SD-04112	4/17/1995	0–0.3	1.2
SD-04113	4/17/1995	0–0.3	5.1
SD-04115	6/27/1995	0–0.3	5.3
SD-04116	6/27/1995	0–0.3	16.2
SD-04117	6/27/1995	0–0.3	3.4
SD-04121	6/14/1995	0–0.3	0.68
SD-04122	6/14/1995	0–0.3	4
SD-UB-001	6/25/2008	2–3	0.027
SD-UB-001	6/25/2008	3–4	0.02 U
SD-UB-001	6/25/2008	4–5	0.019 U
SD-UB-002	6/25/2008	2–3	0.02 UJ
SD-UB-002	6/25/2008	3–4	0.019 U
SD-UB-002	6/25/2008	4–5	0.02 U
SD-UB-003	7/9/2008	1.5–3	1.1
SD-UB-003	7/9/2008	3–4.5	4.9
SD-UB-003	7/9/2008	4.5–6	2.3 J
SD-UB-003	7/9/2008	6–7.5	0.45
SD-UB-003	7/9/2008	7.5–9	0.44
SD-UB-004	6/25/2008	2–3	0.19
SD-UB-004	6/25/2008	3–4	0.02 U
SD-UB-004	6/25/2008	4–5	0.02 U
SD-UB-005	6/25/2008	2–3	6.6
SD-UB-005	6/25/2008	3–4	0.024
SD-UB-005	6/25/2008	4–5	0.02 U
SD-UB-006	7/10/2008	1.5–3	1.47
SD-UB-006	7/10/2008	3–4.5	1.32
SD-UB-006	7/10/2008	4.5–6	0.257
SD-UB-006	7/10/2008	6–7.5	0.106
SD-UB-007	6/26/2008	2–3	0.078
SD-UB-007	6/26/2008	3–4	0.24
SD-UB-007	6/26/2008	4–5	0.166
SD-UB-008	6/26/2008	2–3	0.037
SD-UB-008	6/26/2008	3–4	0.022
SD-UB-008	6/26/2008	4–5	0.03
SD-UB-009	7/2/2008	0–1	0.171
SD-UB-009	7/2/2008	1–2	0.027
SD-UB-009	7/2/2008	2–3	0.019 U
SD-UB-009	7/2/2008	3–4	0.02 U
SD-UB-009	7/2/2008	4–5	0.019 U
SD-UB-010	7/2/2008	2–3	0.019 U
SD-UB-010	7/2/2008	3–4	0.022
SD-UB-010	7/2/2008	4–5	0.02 U
SD-UB-011	6/26/2008	2–3	0.019 U
SD-UB-011	6/26/2008	3–4	0.02 U
SD-UB-011	6/26/2008	4–5	0.02 U
SD-UB-012	7/2/2008	2–3	1.1
SD-UB-012	7/2/2008	3–4	0.02 U
SD-UB-012	7/2/2008	4–5	0.02 U
SD-UB-013	7/2/2008	2–3	0.019 U

Table 2b
Summary of Total PCB Concentrations—Under-building Area

Sample Location	Sample Date	Sample Depth (ft bgs)	Total PCB Concentration (ppm)
SD-UB-013	7/2/2008	3–4	0.02 U
SD-UB-013	7/2/2008	4–5	0.02 U
SD-UB-014	7/2/2008	2–3	0.02 U
SD-UB-014	7/2/2008	3–4	0.019 U
SD-UB-014	7/2/2008	4–5	0.02 U
SD-UB-015	7/3/2008	2–3	0.02 U
SD-UB-015	7/3/2008	3–4	0.02 U
SD-UB-015	7/3/2008	4–5	0.02 U
SD-UB-016	7/10/2008	1.5–3	3.2
SD-UB-016	7/10/2008	3–4.5	3
SD-UB-016	7/10/2008	4.5–6	1.3
SD-UB-016	7/10/2008	6–7.5	0.52
SD-UB-016	7/10/2008	7.5–9	0.12
SW-17	8/20/2002	5–6	0.071 U
SW-17	8/20/2002	11–12	0.083 U
SW-17	8/20/2002	14–15	0.081 U
SW-23	9/5/2002	4.4–4.8	0.068 U
SW-23	9/5/2002	10–11	0.072 U
SW-23	9/5/2002	13.8–14.4	0.074 U
SW-29	8/16/2002	3–4	0.067 U
SW-29	8/16/2002	8–9	0.068 U
SW-29	8/16/2002	14–15	0.084 U
SW-35	8/23/2002	3–4	0.075 U
SW-35	8/23/2002	8–9	0.073 U
SW-35	8/23/2002	14–15	0.081 U
SW-48	8/21/2002	3–4	0.071 U
SW-48	8/21/2002	11–12	0.073 U
SW-48	8/21/2002	14–15	0.083 U
		Mean	1.0
		Maximum	17

Abbreviations:

ft bgs Feet below ground surface
PCB Polychlorinated biphenyl
ppm Parts per million

Qualifiers:

J Estimated value
U Not detected at concentration greater than the laboratory method detection limit
UJ Not detected at concentration greater than the laboratory method detection limit, estimated value

Table 2c
Summary of Total PCB Concentrations—Outfall 12 Early Action Area

Sample Location	Sample Date	Sample Depth (ft bgs)	Total PCB Concentration (ppm)
SD-DUW99	6/19/2001	0–0.9	51
SD-DUW99	6/19/2001	1–2.8	25

Abbreviations:

ft bgs Feet below ground surface
PCB Polychlorinated biphenyl
ppm Parts per million

Table 3
Southern Shoreline Structure Removal Tracking and Sample Matrix

Tracking #	Structure Description	Closest Column Line	Media to Sample	Analytes to Sample	Notes
1	Boeing 9	Not Applicable	Solids, sludge	PCBs, TPH, and RCRA 8 metals for TCLP	Known PCB source contamination; segregate as suspected TSCA waste. Inspect and test prior to disposal.
2	Outfall Z (to remain in use until at least winter 2013)	Not Applicable	Solids, sludge	PCBs, TPH, and RCRA 8 metals for TCLP	Known PCB source contamination; segregate as suspected TSCA waste. Inspect and test prior to disposal.
3	Outfall Y	Not Applicable	Not Applicable	No Sampling, see notes for handling	Known PCB source contamination; segregate and dispose of as TSCA waste.
4	Outfall X	VD	Not Applicable	No Sampling, see notes for handling	Known PCB source contamination; segregate and dispose of as TSCA waste.
5	Outfall W	VB	Not Applicable	No Sampling or special handling	No inspection or testing necessary. Dispose of as C&D solid waste.
6	Stretch Press Pit	VA-25	Water (~100,000 g)	Water testing completed, see notes for discharge	Treat water through on-site treatment system prior to discharge.
			Concrete	PCBs	Known PCB source contamination; segregate as TSCA waste; test to confirm.
7	Outfall V	VA	Solids, sludge	PCBs, TPH, and RCRA 8 metals for TCLP	If solids or sludge are present in the pipe, test prior to disposal. If pipe appears clean, dispose of as C&D solid waste.
8	Outfall U	U	Solids, sludge	PCBs, TPH, and RCRA 8 metals for TCLP	If solids or sludge are present in the pipe, test prior to disposal. If pipe appears clean, dispose of as C&D solid waste.
9	Outfall T	U	Solids, sludge	PCBs, TPH, and RCRA 8 metals for TCLP	If solids or sludge are present in the pipe, test prior to disposal. If pipe appears clean, dispose of as C&D solid waste.
10	Outfall S	T	Not Applicable	No Sampling or special handling	No inspection or testing necessary. Dispose of as C&D solid waste.
11	Outfall R	S	Solids, sludge	PCBs, TPH, and RCRA 8 metals for TCLP	If solids or sludge are present in the pipe, test prior to disposal. If pipe appears clean, dispose of as C&D solid waste.
12	Outfall Q	Between Q&R	Solids, sludge	PCBs, TPH, and RCRA 8 metals for TCLP	If solids or sludge are present in the pipe, test prior to disposal. If pipe appears clean, dispose of as C&D solid waste.
13	Outfall P	N	Not Applicable	No Sampling or special handling	No inspection or testing necessary. Dispose of as C&D solid waste.
14	Outfall O	D	Not Applicable	No Sampling or special handling	No inspection or testing necessary. Dispose of as C&D solid waste.
15	Unknown Metal Sump	L-25	Water	PCBs, TPH, and RCRA 8 metals	Do not need to test residual sediment separately, remove with water.
			Metal	No Sampling or special handling	If PCBs > 3 ppb in water, may require decontamination (clean debris surface).
16	Unknown Concrete Sump	D-25	Water	Not Applicable	Filled with clean sand and gravel, testing not necessary.
			Concrete	PCBs if necessary (see note)	Inspect concrete, sample if staining is present.
17	Freezer	K-25	Water (~46,000 g)	Water testing completed, see notes for discharge	Treatment is not necessary for discharge, direct to POTW.
			Concrete	No Sampling or special handling	If freezer equipment present, inspect for possible freon.
18	TCE Degreaser	J-25	Water (~25,000 g)	Water testing completed, see notes for discharge	Treatment is not necessary for discharge, direct to POTW.
			Concrete	TCE, PCBs if necessary (see note)	Inspect concrete, sample for PCBs only if staining is present.
19	Outfall N	I	Solids, sludge	PCBs, TPH, and RCRA 8 metals for TCLP	If solids or sludge are present in the pipe, test prior to disposal. If pipe appears clean, dispose of as C&D solid waste.
20	71-13 Pit	I-25	Water	Not Applicable	Filled with clean sand and gravel, testing not necessary.
			Concrete	No Sampling or special handling	No inspection or testing necessary. Dispose of as C&D solid waste.
21	71-23 Pit	H-25	Water	Not Applicable	Filled with clean sand and gravel, testing not necessary.
			Concrete	No Sampling or special handling	No inspection or testing necessary. Dispose of as C&D solid waste.
22	71-14 Pit	G-25	Water	Not Applicable	Filled w/ Clean sand &gravel, testing not necessary.
			Concrete	No Sampling or special handling	No inspection or testing necessary. Dispose of as C&D solid waste.
23	Outfall M	C	Not Applicable	No Sampling	No inspection or testing necessary. Dispose of as C&D solid waste.
24, 25, 26	Quench Tanks (3 tanks)	H-25	Water	PCBs and metals are COCs, Also include POTW[1] requirements	Units likely filled with concrete based on preliminary inspection, test water if present.
			Concrete	PCBs	Inspect concrete, sample if staining is present.
27	71-34 Pit	G-26	Water (~8,500 g)	Water testing completed, see notes for discharge	Treatment is not necessary for discharge, direct to POTW.
			Concrete	No Sampling or special handling	No inspection or testing necessary. Dispose of as C&D solid waste.
28	Underflow Flume	F-25	Water (~3,500 g)	Water testing completed, see notes for discharge	Treat water through on-site treatment system prior to discharge.
			Concrete	PCBs, cyanide (total and amenable), metals	Segregate as TSCA waste, test to confirm. Run TCLP if metals fail the 20x rule.

Note:

1 POTW Requirements for water discharge include Metro Metals 7 (cadmium, chromium, copper, lead, nickel, zinc); VOCs; pH (field and analytical) and PCBs. Note that there may be overlap with unit specific COC(s).

Abbreviations:

C&D	Construction and demolition
g	Gallons
PCB	Polychlorinated biphenyl
POTW	Publically Owned Treatment Works
ppb	Parts per billion
RCRA	Resource Conservation and Recovery Act
TCE	Trichloroethylene
TPH	Total petroleum hydrocarbons

Boeing Plant 2

TSCA Risk-based Disposal Application

Figures

FINAL

East Marginal Way S.

16 Ave S.

Slip 4
Sediment Cleanup

Building 2-122

North Shoreline Area

Building 2-10

Building 2-40 Complex

South Shoreline Area

Outfall 12 Area

Federal Navigation Channel

DSOA Sediment Cleanup

2.8 2.9 3.0 3.1 3.2 3.3 3.4 3.5 3.6 3 >

EXPLANATION

- In-Water Dredge Areas
- North Shoreline Area
- South Shoreline Area: Under-Building Area (Slab/Piling Demolition and Sediment Excavation)
- South Shoreline Area Excavation
- South Shoreline Area: Southwest Bank Excavation
- Boeing Property Line
- 3.2 Duwamish River Mile

APPROXIMATE SCALE IN FEET

0 300 600

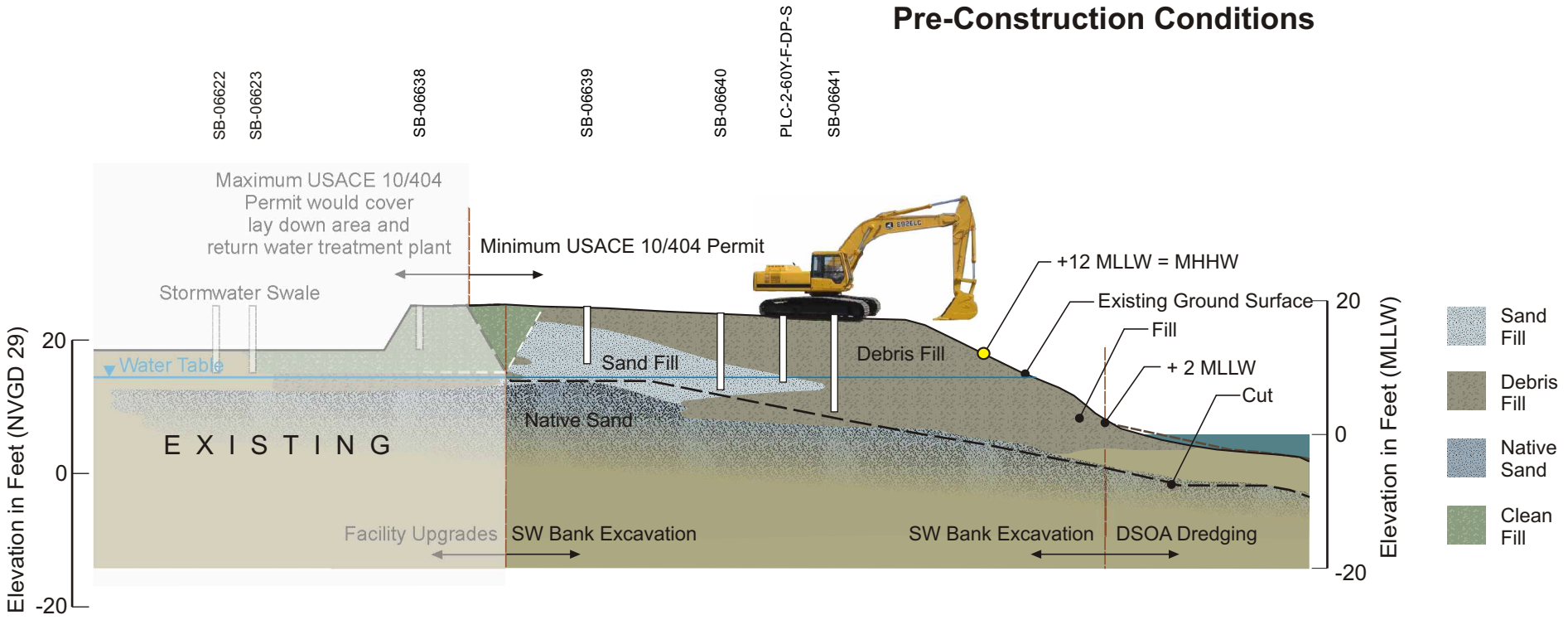
BOEING

PROJECT COMPONENTS
Design Report
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

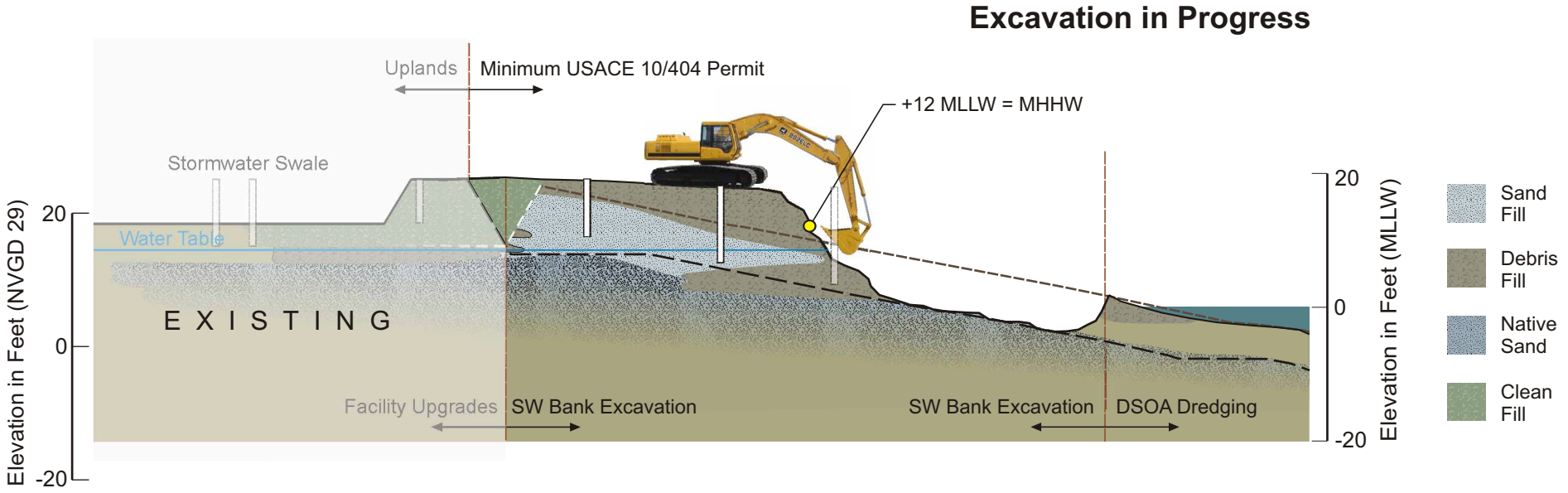
By: GSM	Date: 12-14-2011	Project No. 0131320050
		Figure 1

Plot Date: 12/14/11 - 1:56pm Plotted by: adam.stenberg
Drawing Path: S:\13132_004\DSOA Design\Design Report\ Drawing Name: Figure 2_Project Components_111811.dwg

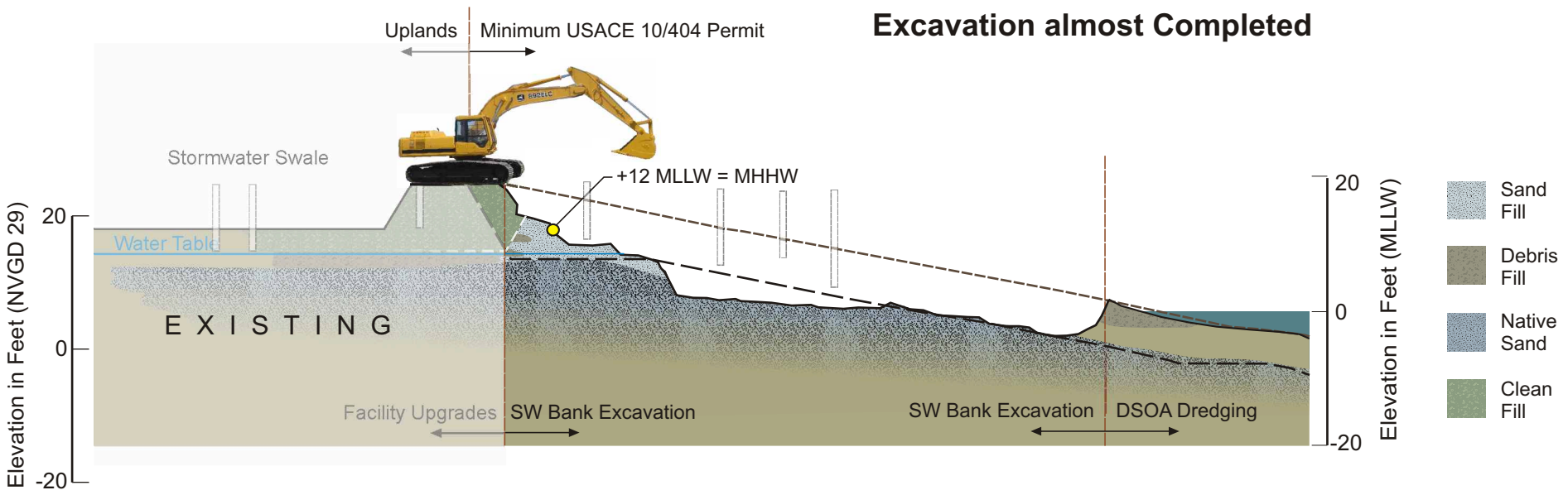
Pre-Construction Conditions



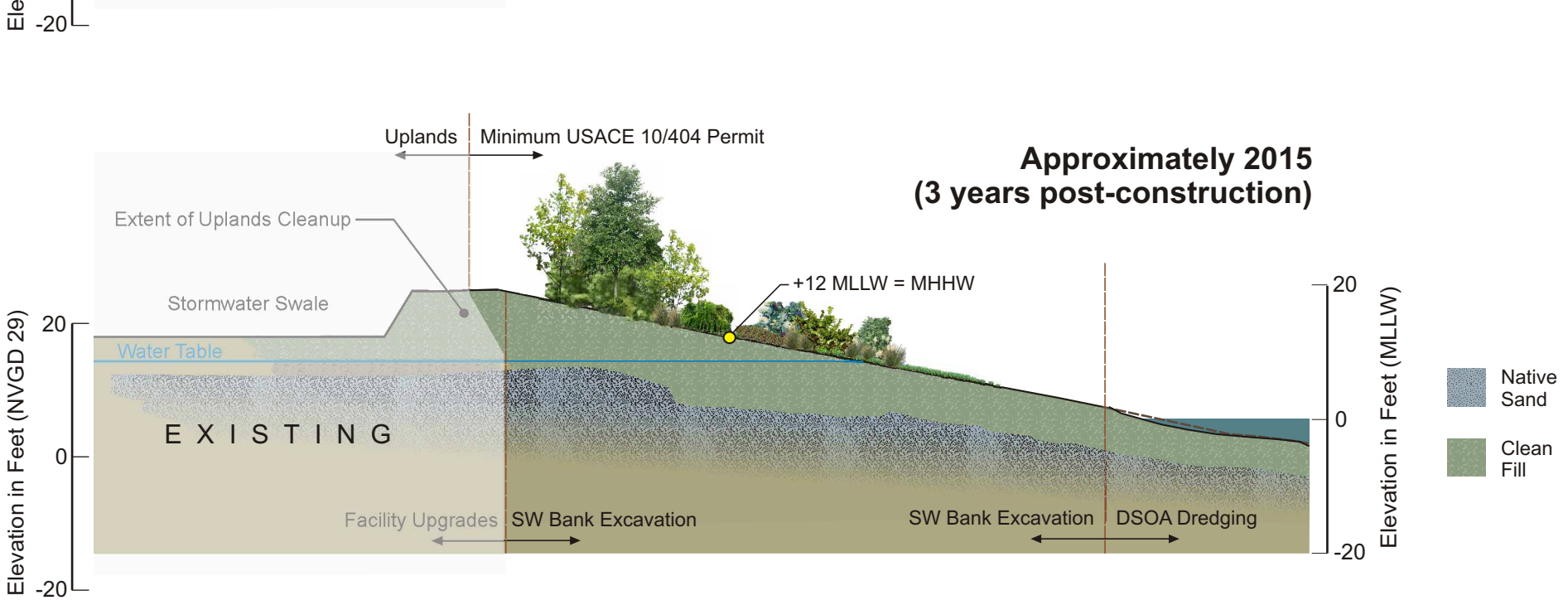
Excavation in Progress



Excavation almost Completed



Approximately 2015 (3 years post-construction)



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TSCA Risk-Based Disposal Application
Duwamish Sediment Other Area and Southwest Bank Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Figure **2**
Schematic of Bank Excavation

G:Project\Clients\Floyd Snider\Boeing\2011\Corel/Sections

Sample Location	Sample Date	Depth (ft bgs)	Total PCBs Conc. (mg/kg)
SD-04116	6/27/1995	0–0.3	16

Sample Location	Sample Date	Depth (ft bgs)	Total PCBs Conc. (mg/kg)
SD-04109	4/17/1995	0–0.3	17

Sample Location	Sample Date	Depth (ft bgs)	Total PCBs Conc. (mg/kg)
SD-DUW99	6/19/2001	0–0.9	51
	6/19/2001	1–2.8	25

Sample Location	Sample Date	Depth (ft bgs)	Total PCBs Conc. (mg/kg)
SD-04904	2/17/1995	0–0.3	10
	2/17/1995	0.3–1.5	8
	2/17/1995	1.5–3	10 J
	2/17/1995	1.5–3	18 J

Sample Location	Sample Date	Depth (ft bgs)	Total PCBs Conc. (mg/kg)
SD-SWY03	6/13/1995	0–0.3	23 J

Area Enlarged

N

0 50 100 200

Scale in Feet

Overview of Plant 2

Legend

- 2-66 Sheetpile (AMEC, April 2011)
- South Shoreline Area
- Outfall 12 Early Action Area

Maximum Observed PCB Concentrations (mg/kg)

- 0 to <1
- 1 to <10
- 10 to <25
- 25 to <50
- >=50

Notes:

- Shading in callout boxes indicates sample depth intervals that will be removed as part of the DSOA Southwest Bank Corrective Measure.
- Hybrid orthoimagery provided by the USGS (2009) and David C. Smith and Associates, Inc., (2011).

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TSCA Risk-Based Disposal Application
South Shoreline Work Elements
Boeing Plant 2
Seattle/Tukwila, Washington

Figure 3
PCB Distribution in Sediment/Soil
in South Shoreline Area

I:\GIS\Projects\BOE-PL2\MXD\SWBank\Figure 3 (PCB Distribution in Sediment Soil in South Shoreline Area).mxd
4/25/2013

Building 2-49

Outfall 12

Building Face

A

A'

SD-DUW103

1	0.0-0.7	1.58
2	1.0-1.7	0.61
3	2.0-2.6	0.035U
4		na
5		na
6		na

SD-DUW 96

1		
2		
3		
4		
5	4.0-5.0	6.4
6		na
7	6.0-6.7	0.044
8		na
9	8.0-8.6	0.025

SD-DUW99

1	0.0-0.9	51
2	1.0-2.8	25

SD-DUW94

1		
2		
3		
4		
5	4.0-5.0	5.5
6	5.0-6.0	0.31

SD-04406
(1.1 ppm)

SD-DUW102

1	0.0-0.6	1.08
2	1.0-2.0	0.59
3	2.0-3.3	0.037
4		na
5		na
6		na
9		

SD-DUW98

1		na
2		na
3	2.0-3.0	0.036
4		na
5	4.0-5.0	0.04U
6		na
7	6.0-7.0	0.039U
8		na
9	8.0-8.5	0.036U

SD-DUW97

1		
2		
3	2.0-3.0	3.3
4		na
5	4.0-5.0	0.035U
6		na
7	6.0-6.7	0.036U

SD-04402
(0.19 ppm)

B8a
(5.9J ppm)

APPROXIMATE SCALE IN FEET

0 2.5 5 10

Elevations in Feet MLLW

SD-DUW xx

1	0.0-0.9	51
2	1.0-2.8	25
3		
4		
5	4.0-5.0	6.4
6		na
7	6.0-6.7	0.044
8		na
9	8.0-8.6	0.025

Sample Interval | Total PCBs as ppm dwt

>50 ppm dwt
>25 and <50 ppm dwt
>0.13 and < 25 ppm dwt
<0.13 ppm dwt

Outfall 12 Cores

Surface Sample
(Total PCB in ppm dwt)

SD-04406
(1.1 ppm)

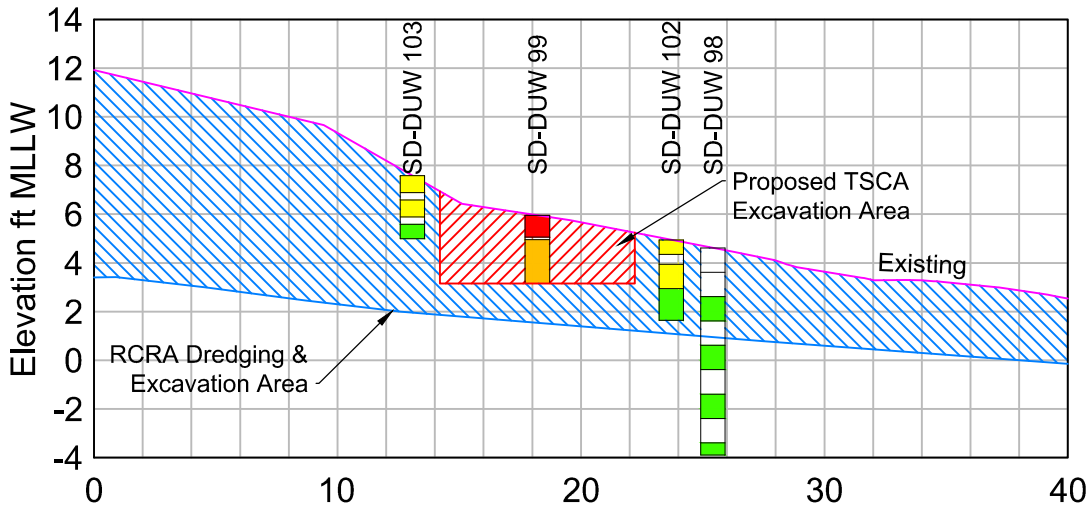
Approximate Footprint of Historical Outfall 12 Interim Measure

Approximate Footprint of Proposed Excavation

Location of Cross Section A-A'

Notes:
dwt = Dry Weight
J = Estimated Value
MLLW = Mean Lower Low Water
PCBs = Polychlorinated Biphenyls
ppm = Parts per Million
U = Undetected at Reporting Limit

Section A-A'



>50 ppm Dry Weight
>25 and <50 ppm Dry Weight
>0.13 and <25 ppm Dry Weight
<0.13 ppm Dry Weight

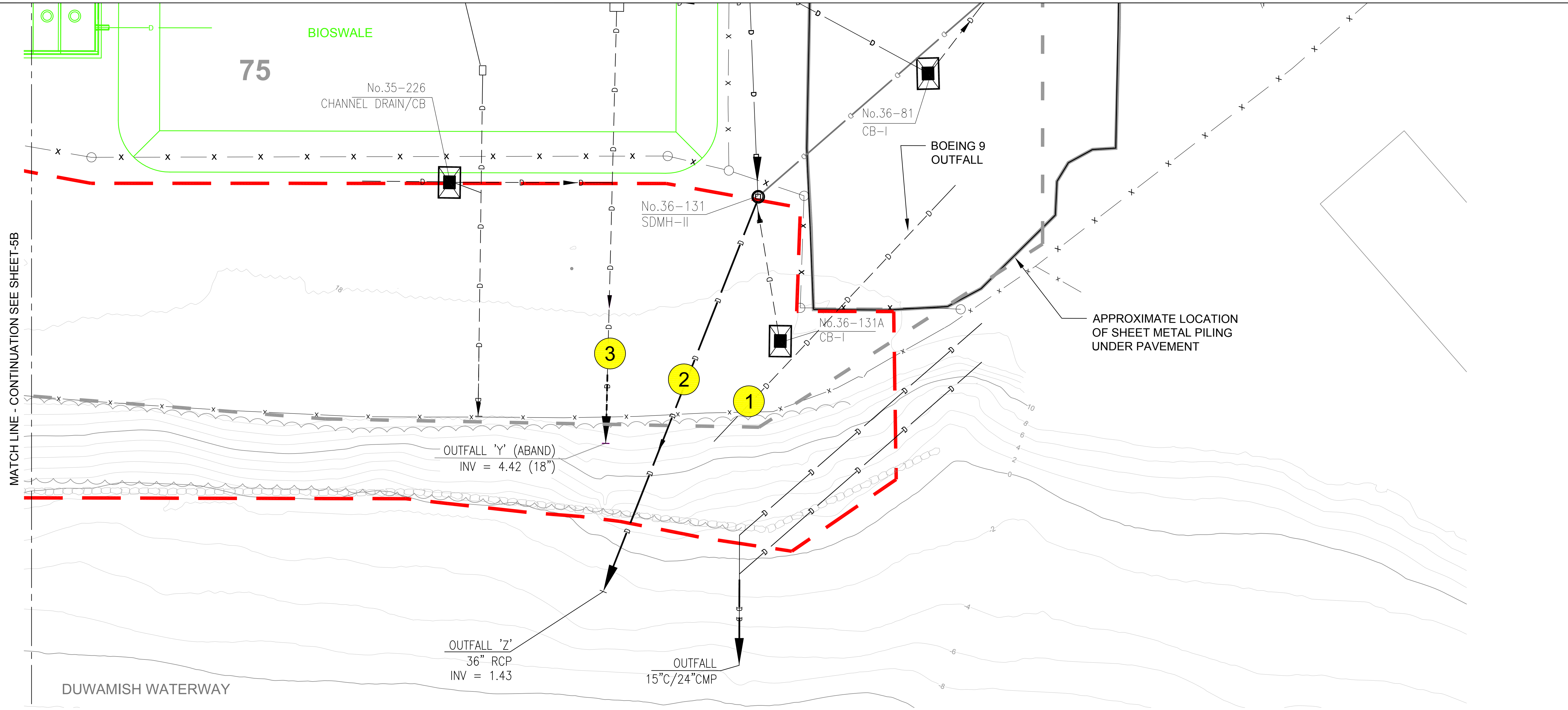
Volume to be removed as part of Early Removal Action

Volume to be removed as South Shoreline and DSOA Corrective Measure

PCB CONCENTRATIONS IN THE OUTFALL 12 EARLY REMOVAL AREA
TSCA Risk-Based Disposal Application
Duwamish Sediment Other Area and Southwest Bank Corrective Measure and Habitat Project

By: GSM	Date: 6/26/2012	Project No: 0131320070
		Figure 4

Plot Date: 06/26/12 - 1:18pm, Plotted by: gary.maxwell
Drawing Path: P:\BOEING\DESIGN\CAD\Upland Shoreline Coordination\TSCA figures\, Drawing Name: Figure 3 PCBs in Outfall 12 Early Removal Area.dwg



NOTES:

1. THE KNOWN AND SUSPECTED SUBSURFACE FEATURES WERE OBTAINED FROM AVAILABLE DRAWINGS ON FILE. CONTRACTOR SHALL VERIFY ACTUAL LOCATIONS AND QUANTITIES. ADDITIONAL UTILITIES MAY BE PRESENT; IF SO, NOTIFY CONSTRUCTION MANAGER IMMEDIATELY.

LEGEND

- EXISTING CONTOUR LINE (2FT INTERVAL)
- FENCE
- APPROXIMATE LIMIT OF WORK
- SITE AREAS AS IDENTIFIED IN FIGURES PRODUCED BY GOLDER ASSOCIATES INC.
- APPROXIMATE LOCATION OF OUTFALL
- APPROXIMATE LOCATION OF MOUTH OF OUTFALL, IF AVAILABLE
- STORM DRAIN
- CATCH BASIN
- 1 UNIT TRACKING NUMBER

APPROXIMATE SCALE IN FEET
0 15 30

Elevation Datum: 0=MLLW

100% DESIGN
NOT APPROVED FOR
CONSTRUCTION

SYM	REVISION	BY	APPROVED	DATE	SYM	REVISION	BY	APPROVED	DATE

BOEING®

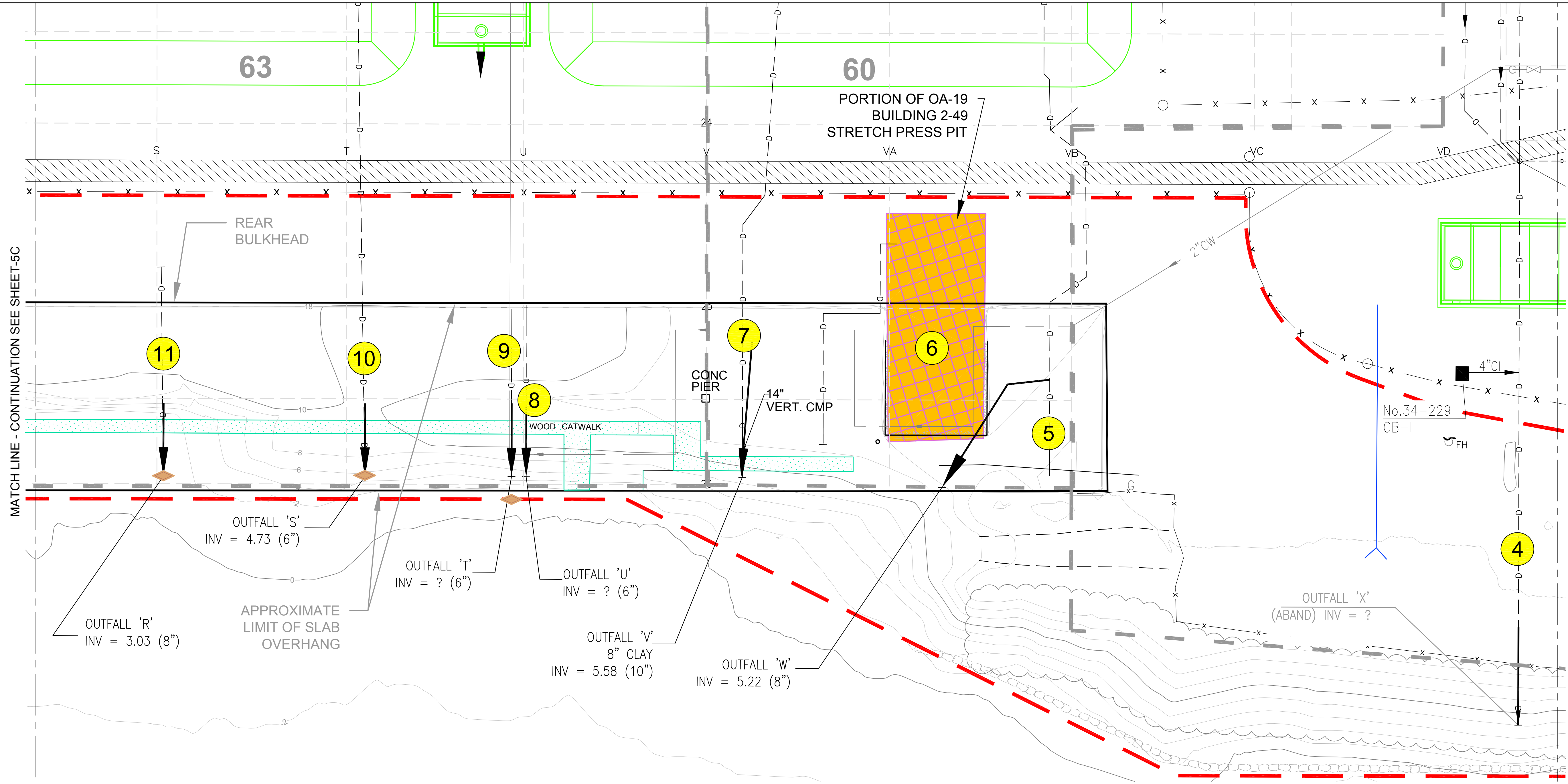
ACCEPTABILITY
THIS DESIGN AND/OR SPECIFICATION IS APPROVED
APPROVED BY | DEPT. | DATE

DRAWN APS | DATE 06/23/11
CHECKED
ENGINEER
CHECKED
APPROVED
APPROVED

SUBTITLE: SOUTHERN SHORELINE STRUCTURE MAP

TITLE: BOEING PLANT 2
SOUTH SHORELINE AREA

CURRENT REVISION 04/17/13 | SYMBOL | DATE
SHEET 5A
JOB NO. 0131320080 | COMP NO.
DWG NO.



LEGEND

EXISTING CONTOUR LINE (2FT INTERVAL)	SUBSURFACE DUCT BANK
FENCE	STORM DRAIN
APPROXIMATE LIMIT OF WORK	18" DIAMETER TEMPORARY EMERGENCY OVERFLOW PIPE
SITE AREAS AS IDENTIFIED IN FIGURES PRODUCED BY GOLDER ASSOCIATES INC.	CAT WALK
APPROXIMATE LOCATION OF OUTFALL	RCRA UNIT
APPROXIMATE LOCATION OF MOUTH OF OUTFALL, IF AVAILABLE	UNIT TRACKING NUMBER

APPROXIMATE SCALE IN FEET
0 15 30

Elevation Datum: 0=MLLW

100% DESIGN
NOT APPROVED FOR
CONSTRUCTION

SYM	REVISION	BY	APPROVED	DATE	SYM	REVISION	BY	APPROVED	DATE

BOEING

ACCEPTABILITY
THIS DESIGN AND/OR SPECIFICATION IS APPROVED

APPROVED BY	DEPT.	DATE

DRAWN APS — DATE 06/23/11
CHECKED
ENGINEER
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SUBTITLE: SOUTHERN SHORELINE STRUCTURE MAP

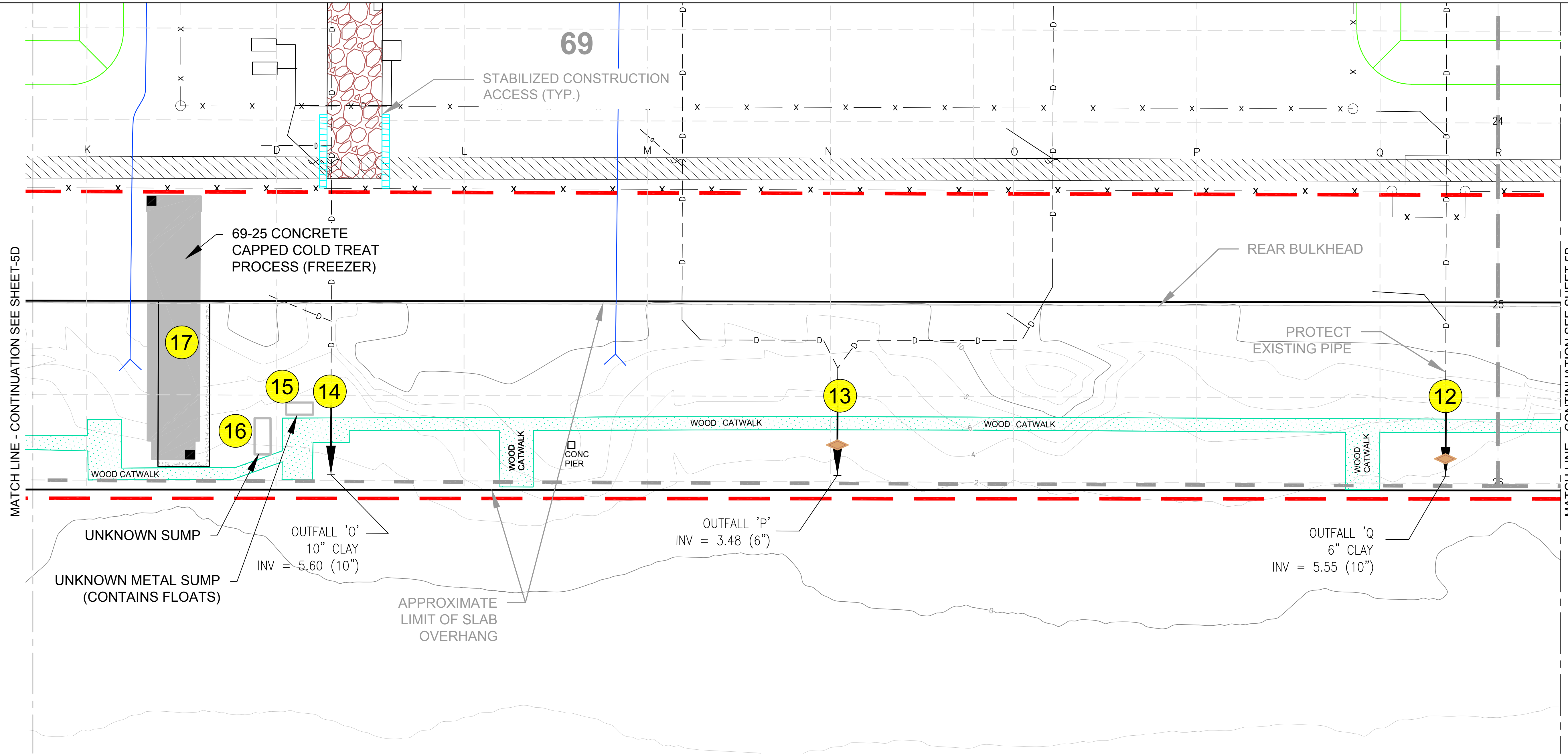
TITLE: BOEING PLANT 2 SOUTH SHORELINE AREA

CURRENT REVISION: 04/23/13 — SYMBOL — DATE

SHEET: 5B

JOB NO.: 0131320080 — COMP NO.

DWG NO.



LEGEND

- EXISTING CONTOUR LINE (2FT INTERVAL)
- FENCE
- APPROXIMATE LIMIT OF WORK
- SITE AREAS AS IDENTIFIED IN FIGURES PRODUCED BY GOLDER ASSOCIATES INC.
- APPROXIMATE LOCATION OF OUTFALL
- APPROXIMATE LOCATION OF MOUTH OF OUTFALL, IF AVAILABLE
- SUBSURFACE DUCT BANK
- STORM DRAIN
- 18" DIAMETER TEMPORARY EMERGENCY OVERFLOW PIPE
- CAT WALK
- 12 UNIT TRACKING NUMBER

APPROXIMATE SCALE IN FEET: 0 15 30

Elevation Datum: 0=MLLW

100% DESIGN
NOT APPROVED FOR CONSTRUCTION

SYM	REVISION	BY	APPROVED	DATE	SYM	REVISION	BY	APPROVED	DATE

BOEING

ACCEPTABILITY
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DRAWN: APS | DATE: 06/23/11
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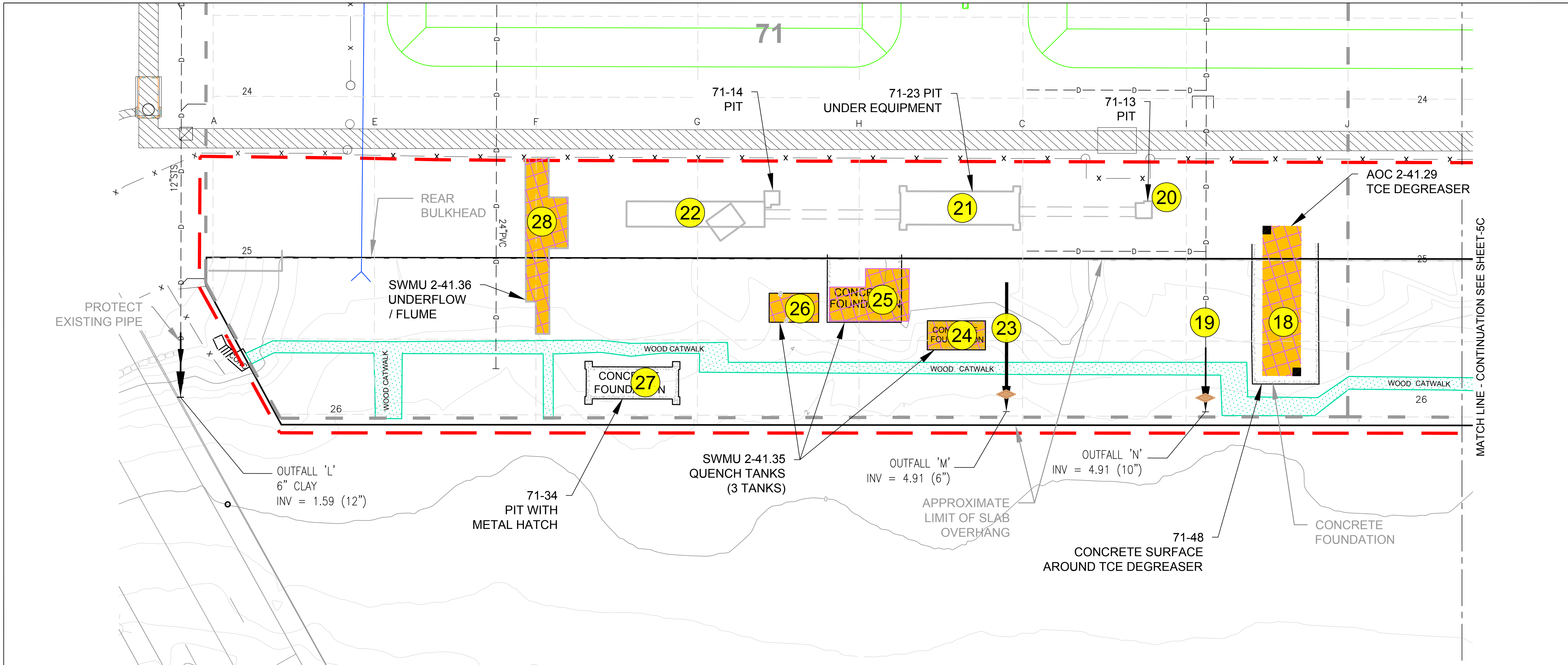
SUBTITLE: SOUTHERN SHORELINE STRUCTURE MAP

TITLE: BOEING PLANT 2
SOUTH SHORELINE AREA

CURRENT REVISION: 04/23/13
SYMBOL
DATE
SHEET: 5C
JOB NO.: 0131320080
COMP NO.
DWG NO.



LEGEND

EXISTING CONTOUR LINE (2FT INTERVAL)	SUBSURFACE DUCT BANK
FENCE	STORM DRAIN
APPROXIMATE LIMIT OF WORK	18" DIAMETER TEMPORARY EMERGENCY OVERFLOW PIPE
SITE AREAS AS IDENTIFIED IN FIGURES PRODUCED BY GOLDER ASSOCIATES INC.	CAT WALK
APPROXIMATE LOCATION OF OUTFALL	CONCRETE FOUNDATION
APPROXIMATE LOCATION OF MOUTH OF OUTFALL, IF AVAILABLE	RCRA UNIT
	18 UNIT TRACKING NUMBER

APPROXIMATE SCALE IN FEET 0 15 30

Elevation Datum: 0=MLLW

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CONSTRUCTION

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APPROVED

SUBTITLE: SOUTHERN SHORELINE STRUCTURE MAP
TITLE: BOEING PLANT 2 SOUTH SHORELINE AREA

CURRENT REVISION 04/23/13 | SYMBOL | DATE
SHEET 5D
JOB NO. 0131320080 | COMP NO.
DWG NO.

Boeing Plant 2

TSCA Risk-based Disposal Application

Appendix A South Shoreline Stockpile Management Plan (Envirocon 2013)

FINAL

South Shoreline Stockpile Management Plan

Boeing Duwamish DSOA Corrective Measure & Habitat Project
Boeing Plant 2
Seattle, Washington

Revision 0
April 8, 2013

Prepared for:

The Boeing Company
P.O. Box 3707 MC 6Y-94
Seattle, Washington 98124

Prepared by:

Envirocon, Inc.
3330 NW Yeon Ave., Ste 240
Portland, Oregon 97210

1.0 PURPOSE

1.1. The purpose of this plan is to identify and provide the operational instructions for the management of stockpiles at the South Shoreline Stockpile Area, located at the Boeing Duwamish DSOA Corrective Measure & Habitat Project, Seattle, WA.

1.2. All personnel performing operations during the demolition phase of the Building 301 D&D Project are required to understand and follow this plan.

2.0 SCOPE

2.1. The scope of work covered in this plan includes the following sub-tasks:

a. Stockpile Designation & Construction

b. Stockpile Water Management

c. Stockpile Maintenance & Operations

2.2. Figures for each sub-task are included in Section 7.0 of this document.

3.0 APPLICABLE PROCEDURES/PLANS/DOCUMENTS

3.1. Final Design Drawings, Duwamish Sediment Other Area and Southwest Bank Corrective Measure and Habitat Project, Boeing Plant 2, Seattle/Tukwila, Washington [AMEC, 2013]

4.0 STOCKPILE DESIGNATION & CONSTRUCTION

The South Shoreline Stockpile Area consists of seven (7) sub-areas to facilitate the South Shoreline Excavation, as shown in Figure 1:

4.1. Clean Stockpile Area

160’ x 290’ stockpile area designated for clean fill imported for backfill operations. This area is not lined but does sit on asphalt pavement, and storm water runoff will be handled using standard BMPs for construction sites (hay bales, straw waddles, filter fabric, etc.) as the stockpile grows/recedes as materials are imported and used.

4.2. Excavated Material Stockpile Area (South)

280’ x 290’ contained stockpile area constructed to handle excavated materials from the South Shoreline, including soils, sediments, and C&D (concrete, wood, pilings, and metal from the demolition of structures along the South Shoreline. The excavated materials will be divided into designated materials for each waste stream as discussed below.

The construction of this area consists of an ecology block perimeter, lined geotextile/PVC/fill layers sitting on an asphalt cap, as shown in Figure 2 – Soil Stockpile Areas. BMPs, including covering with a plastic tarp during times when the pile is not in active use, will be used to reduce storm water contact. However, the excavated materials will already be wet when stockpiled since many are coming from below the water table/maximum shoreline tides. Dredge return water and incidental storm water falling on the stockpile will be captured and treated as described further below.

The area is further divided down the middle as shown in Figure 2, with a 6” berm and a natural break in the drainage of the pavement to create two separate water collection basins: one for hazardous materials and uncharacterized materials and the other for non-hazardous materials.

This stockpile has designated cells for each major waste stream, that will be separated from each other using ecology blocks. The separate cells/waste streams are as follows:

- *In the hazardous materials area:* One cell will accept the hazardous materials excavated from the Southwest Bank (TCLP-lead), one cell will accept PCB-contaminated materials with PCB concentrations greater than or equal to 50 mg/kg (50 ppm); and one cell will accept uncharacterized materials awaiting test results.
- *In the non-hazardous materials area:* One cell will accept contaminated soils/sediments with "soil-like" properties appropriate for use as Alternative Daily Cover at Roosevelt Landfill (and Columbia Ridge Landfill if approval is received in time for this project); the other cell will be used for non-hazardous debris, structures, and general C&D.

4.3. Excavated Material Stockpile Area (North)

A second 280' x 290' contained stockpile area constructed as a contingency for the event that the excavation exceeds the loadout/stockpile capacity of the first stockpile area (South). This area is constructed in the same manner as the South Excavated Material Stockpile Area.

4.4. Contamination Reduction Zone (CRZ)

This area allows for trucks to enter the Stockpile Area, to be loaded with excavated materials, and to leave the site for off-site transport of materials. As shown in Figure 1, an area between the gate and the stockpiles is designated for lining of trucks when required (see Materials Handling Plan). The loading area between the two Excavated Materials Stockpile Areas is bermed with ecology blocks on two sides and 6" berms (allowing from truck movement) on the short sides. The loading area is lined with 20 mil PVC textile on top of asphalt pavement. Water collected from the loading area is treated in the on-site water treatment system.

4.5. RCRA Water Treatment Area

100' x 80' contained area for the construction of the RCRA Water Treatment Plant, which will process water accumulated in the Hazardous & Uncharacterized stockpile areas, and will discharge to the sanitary sewer, as approved. The containment cross-section for this area is located in Figure 2 – Water Management Areas.

4.6. Dredge Water Return System (South)

100' x 150' contained area for the construction of the Interim South Dredge Water Return System, which will process water accumulated in the Non-hazardous stockpile areas (also any other general storm water accumulations throughout the work site), and will discharge to the Duwamish River, as approved. The containment cross-section for this area is located in Figure 2 – Water Management Areas.

4.7. Frac Lagoon Area

150' x 300' area reserved for additional dredge water return equipment which will be installed later in the year to facilitate 2013 dredging operations. This area will be constructed at a later date pending issuance of the final design of this equipment.

4.8. Roll-Off Box Storage Area

60' x 30' area constructed as temporary storage for any roll-off boxes prior to shipment. This area is constructed in the same manner as the water management areas (Figure 2).

5.0 STOCKPILE WATER MANAGEMENT

Two (2) water processing facilities are being constructed to manage accumulated storm water runoff within the construction area: RCRA Water Treatment Plant, Dredge Water Return System.

Each sub-area has been placed according to the existing storm water management physical features of the Former 2-40s Building Complex yard (Figure 3), utilizing existing grade breaks, 6" asphalt berms, and catch basins. Catch basins within the contained areas have been double plugged, and the 20 mil PVC liners of the containments extend into the catch basins. 3" pumps will be installed into the lined catch basins, and

accumulated water will be pumped through a series of hoses and pipes to one of the two water processing plants, as follows:

- RCRA Water Treatment Plant: Hazardous waste and uncharacterized stockpile areas
- Dredge Water Return System: Non-hazardous (Subtitle D) stockpile areas and general site storm water accumulations

A series of 6" asphalt berms will also be constructed to manage storm water runoff in the general work areas. These berms also serve as protection for utility crossings, specifically piping to the water treatment plants. Water from these general bermed areas will be collected with sump pumps and transferred into the stockpile areas, where the 3" catch basin sumps will pump the water to its respective water processing plant.

6.0 STOCKPILE MAINTENANCE AND OPERATIONS

6.1. Stockpile Maintenance

All stockpiles will be covered daily by the end of shift, including clean backfill material. Any stockpile which does not require addition or removal of material will remain covered until uncovering is required. Stockpile areas will be inspected daily to ensure containment integrity remains in-tact, and any deficiencies will be corrected immediately.

6.2. Stockpile Operations

Figure 4 illustrates the coordination of both off-road articulating trucks hauling material from the excavation to the stockpile area and on-road dump trucks for off-site disposal.

Off-road articulating trucks will exit the shoreline excavation and enter the stockpile areas over haul routes consisting of geotextile fabric under a layer of 4" quarry spalls. These haul routes will be removed and disposed of at the end of the excavation project. Artic trucks will dump in the stockpile area without leaving the stockpile containment boundary, and will re-enter the excavation using the same haul routes.

On-road trucks for off-site disposal will enter the project through the east gate, will proceed (if required) to the area designated for container lining located at the northeast corner of the project site, and will then enter the CRZ for loading. Once loaded, the truck will be inspected for any residual material, which will be removed prior to leaving site. The CRZ will be inspected and cleaned (if necessary) between each truck for the duration of loadout operations.

6.3. Stockpile Demobilization

The South Shoreline Stockpile Area is anticipated to be demobilized following completion of excavation operations in late 2013. The following procedures will be implemented to decontaminate and/or dispose of stockpile materials and equipment which may have come in contact with PCB remediation waste generated during excavation operations:

- *Excavated Material Stockpile Areas:* Asphalt will be pressure washed to clean debris surface standards, with collected wash water pumped into the respective water treatment system (Section 5.0). Once cleaned, the asphalt and fill material will be loaded into off-site haul trucks and disposed of as Non-hazardous (Subtitle D) waste. The liner and fabric materials will then be rolled/folded and sized as necessary for disposal in the same manner.
- *Water Treatment Areas:* Fill material will be loaded into off-site haul trucks and disposed of as Non-hazardous (Subtitle D) waste. The liner and fabric materials will then be rolled/folded and sized as necessary for disposal in the same manner.

All water treatment equipment will be pressure washed free of surface debris prior to leaving site. Wash water will be pumped through the water treatment systems until the final post-treatment tanks are required to be shut down for cleaning, at which point wash water will be transferred to an

alternate Boeing treatment system (i.e. NBF), as approved. Hand tools and any other support equipment will be decontaminated in the same manner.

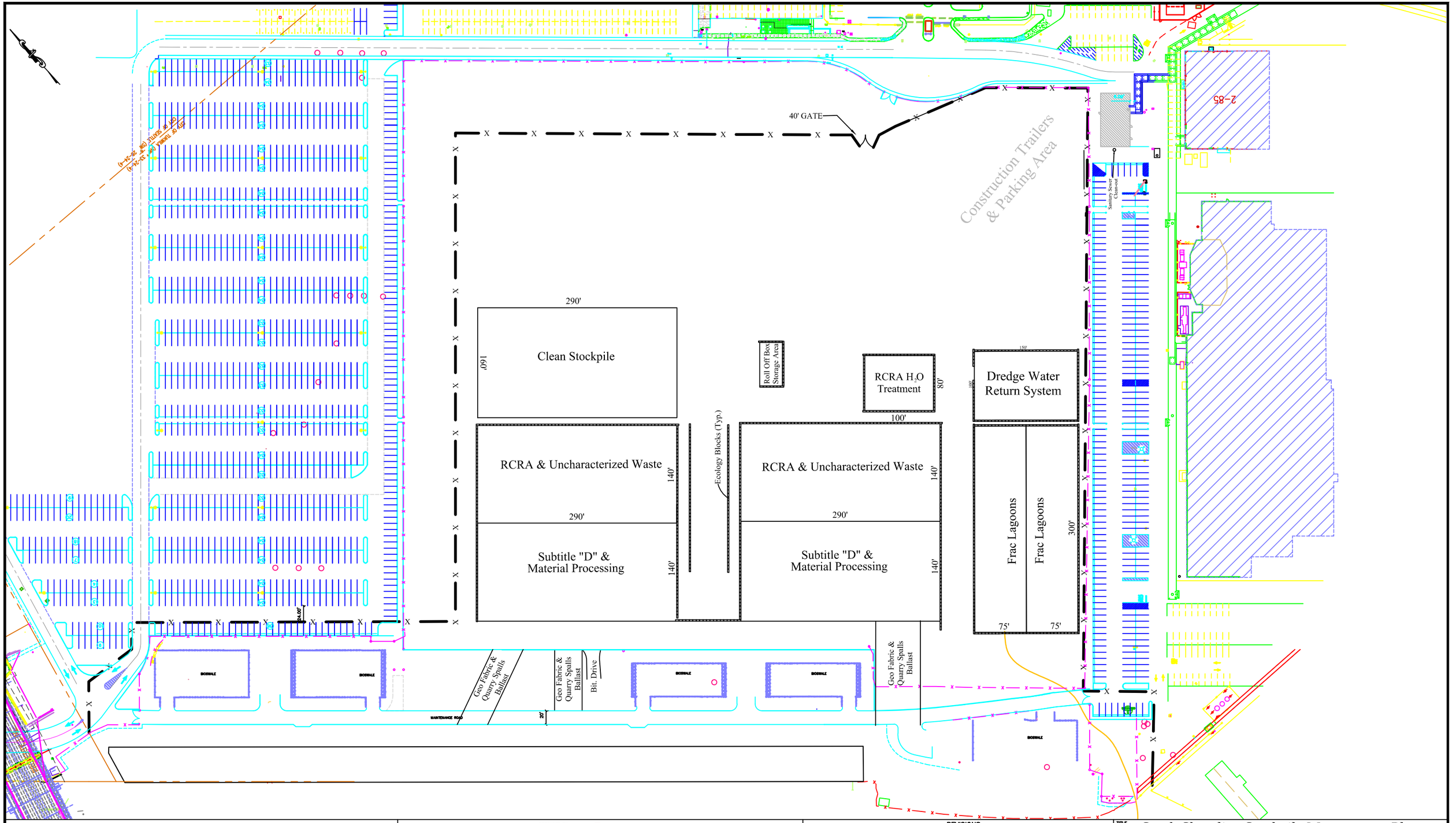
7.0 FIGURES

Figure 1 – Stockpile Designation

Figure 2 – Typical Containment Cross Sections

Figure 3 – Stockpile Water Management

Figure 4 – Stockpile Operations



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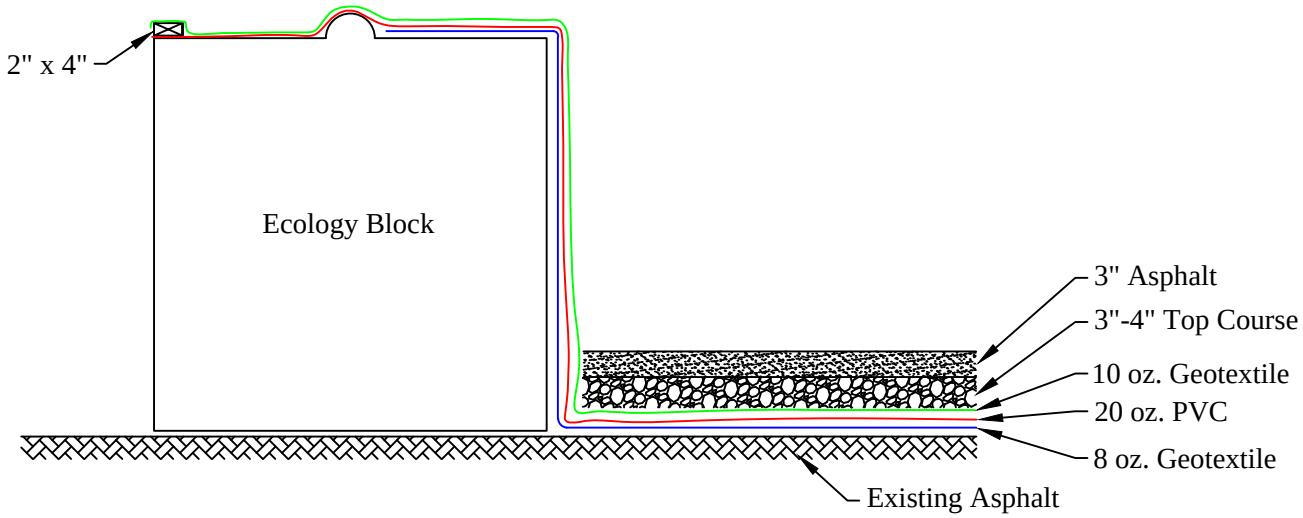
REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED

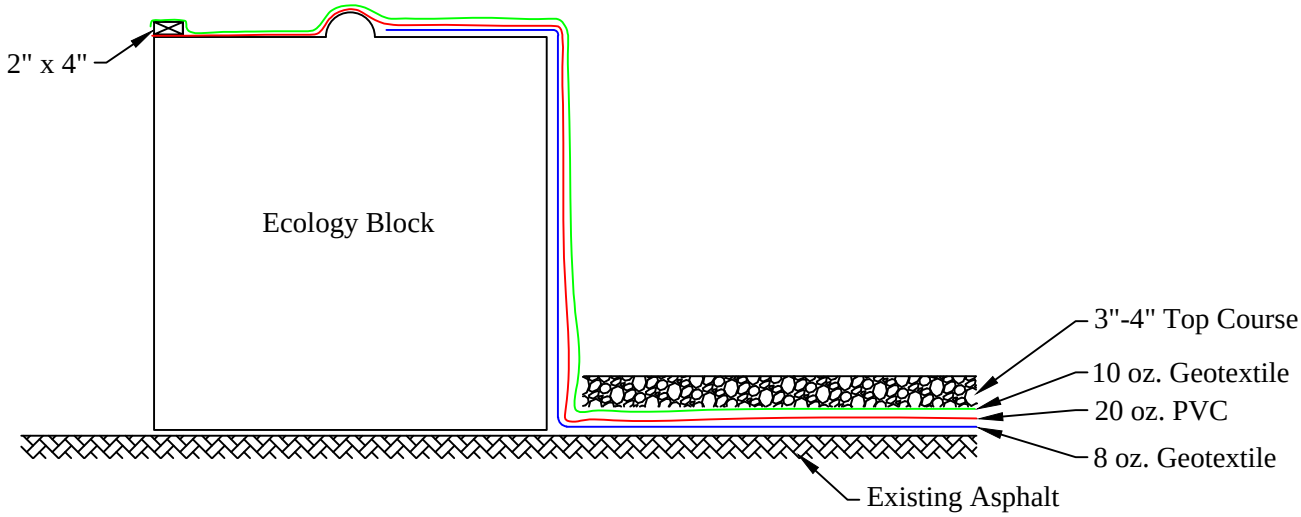
TITLE: South Shoreline Stockpile Management Plan
Figure 1 - Stockpile Designations

DRAWN BY: DC	LOCATION: Boeing, Duwamish		DWG NO. Exhibit
REVIEWED BY:	SCALE N.T.S.	DATE 04/05/2013	SHEET 1 OF 1

Soil Stockpile Areas



Water Mangement Areas



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TITLE
South Shoreline Stockpile Management Plan
Figure 2 - Typical Containment X-sections

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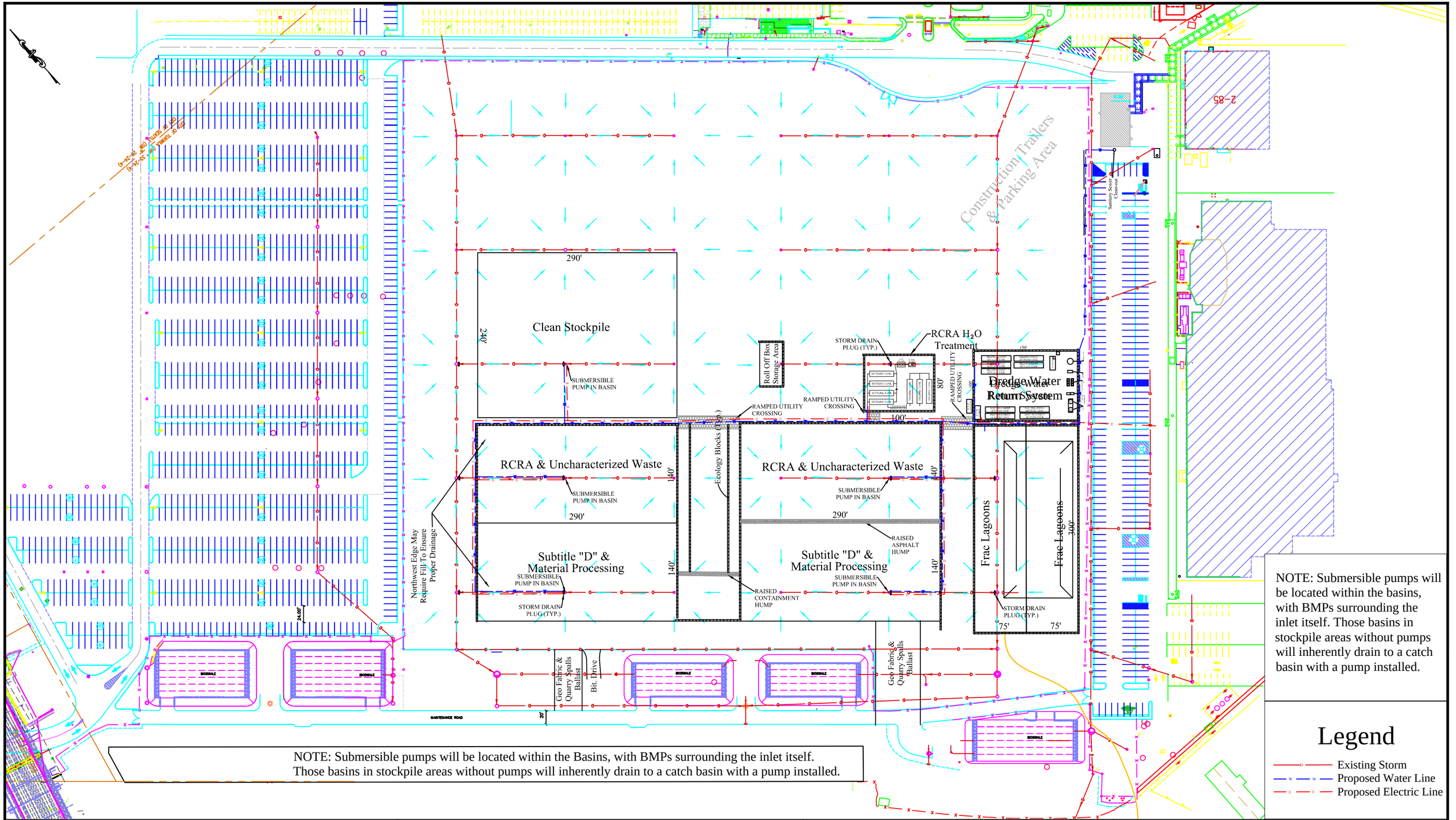
DC	Boeing Duwamish	Containment
REVIEWED BY:	SCALE	DATE
SS	N.T.S.	2/19/2013

SHEET 01 OF 01



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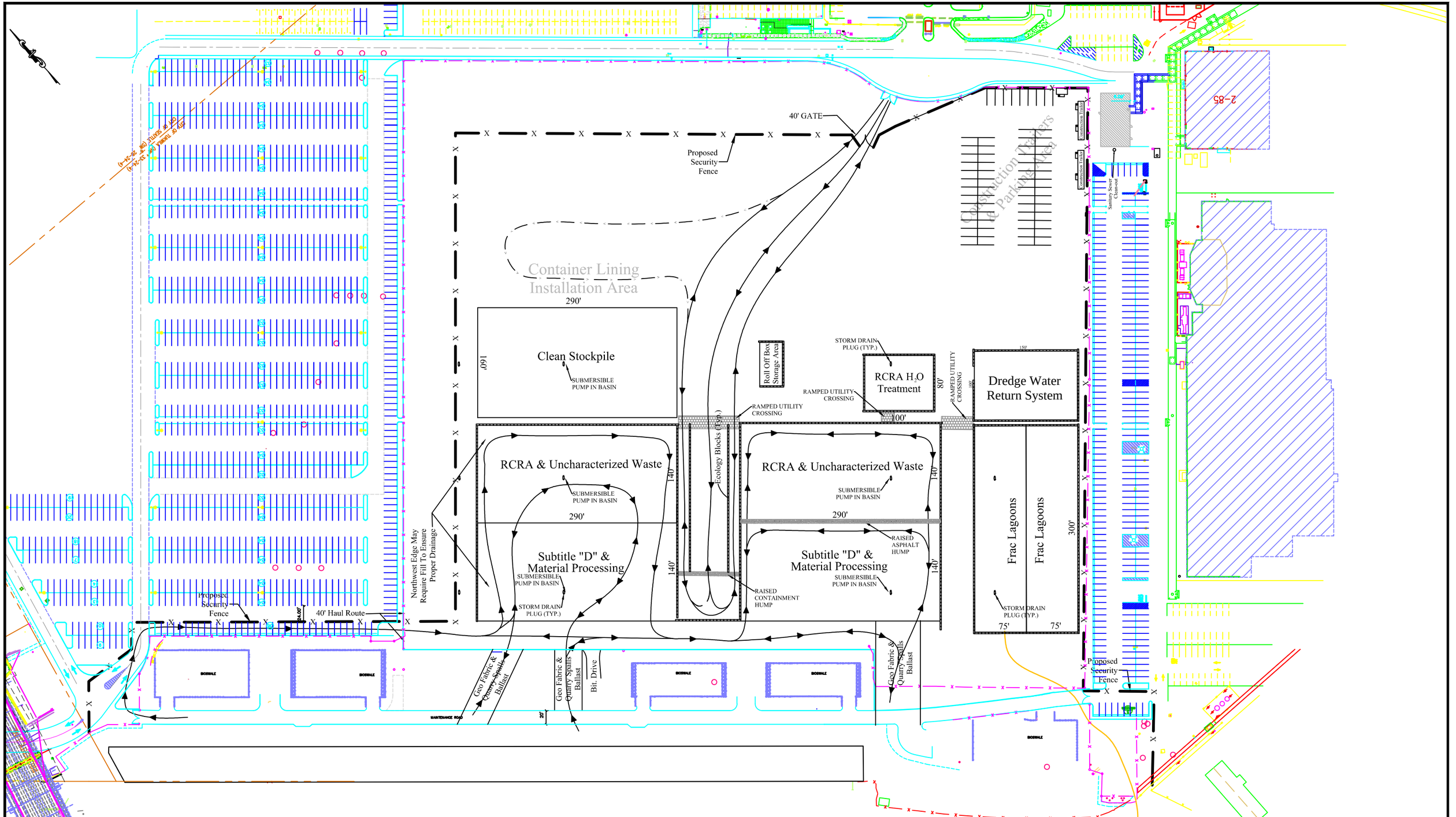
ZONE	REV	DESCRIPTION	DATE	APPROVED

TITLE: South Shoreline Stockpile Management Plan
Figure 3 - Stockpile Water Management

DRAWN BY:	LOCATION:	DWG NO.
DC	Boeing, Duwamish	Exhibit
REVIEWED BY:	SCALE	DATE
CL	N.T.S.	04/04/2013
		SHEET 1 OF 1



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ZONE	REV	DESCRIPTION	DATE	APPROVED

TITLE: South Shoreline Stockpile Management Plan
Figure 4 - Stockpile Operations

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DC	Boeing, Duwamish	Exhibit
REVIEWED BY:	SCALE	DATE
CL	N.T.S.	04/04/2013

SHEET 1 OF 1